The Dinerstein Companies

North Legacy Project Narrative

Development Review Board Submittal

June 26, 2023

Ordinances, Master Plans, General Plan, and Standards

- The proposed development includes many diverse elements outlined in the overall general plan for the City of Scottsdale. Some of these include, but are not limited to, Character and Culture, Sustainability and Environment, Community Well-Being and Connectivity.

Character and Culture: The project design takes cues from the rich desert surroundings as well as the unique and significant architectural history of the area. The key feature on the site is the wide view corridor that divides the townhome on the north and the apartments on the south. This outdoor corridor extends the entire length of the site from east to west and incorporates outdoor "living rooms" and seating areas with framed views of the McDowell Mountains. Additionally, large outdoor amenity areas are designed to include native and climate appropriate planting and shaded lounges where residents feel connected to the surrounding desert landscape. Large setbacks along the major roads bordering the site create a suburban feel, protecting residents from the street with gated walkways and landscape buffers. Although the site feels suburban, the architecture is inherently urban, with three story townhome and apartment buildings. Outdoor spaces are shaped by residential buildings featuring design elements that are deeply influenced by desert modern architecture. These include large simple vertical massing and planar surfaces contrasted by large horizontal shading elements and deep recesses that provide shade for the buildings. Simple earth tone color schemes and materials help ground the buildings into the desert while showcasing the natural beauty of the surrounding landscape. Together, these thoughtfully designed key design elements create a project that is uniquely Scottsdale.

Sustainability and Environment: The layout of the site seeks to achieve multiple Master Plan goals related to sustainability and the environment. Multiple outdoor amenity spaces feature native vegetation and drought tolerant plants. Views toward the McDowell Mountains are preserved and enhanced via large landscape view corridors and outdoor lounge areas. Buildings are strategically placed to create density but still maintain views from key buildings, including the central amenity buildings and pool deck. Large setbacks allow for buffered roadways with landscaping and natural features, which add to the aesthetic and environmental character of the site. Additionally, the architecture is designed to passively shade units using long overhangs and deep recesses. Fins, wrap around awnings, and louvers are used extensively to provide shading on the south, east, and west facades, while most buildings are oriented with their shortest facades aligned from east to west to further prevent heat gain on southern elevations of the buildings.

Community Well-Being: This project seeks to provide diverse, safe, high-quality housing for North Scottsdale. A mixture of 1-2 bedroom apartments and 3 bedroom townhomes make up the diverse mix of

units on site. Shaded balconies and private outdoors spaces of each unit allows for outdoor lounging while viewing the surrounding landscape of Scottsdale. All units share central amenities featuring a large pool deck flanked by a leasing building containing a clubroom and co-working spaces, and a fitness building featuring a gym and yoga deck. Multiple outdoor "rooms," dog parks, and a walkway loop around the site encourage residents to spend time outdoors and interact with one another. The trail easement to the North of the site encourages hiking and biking and provides a connection to Thompson Peak Park. The project also promotes safety and security for residents by utilizing motorized vehicular gates at both entry points into the community. Additionally, the entire property will be gated with keyed entry via pedestrian gates located at multiple points around the site.

Connectivity: The project is located directly North of Arizona State Route 101 and directly East of N Scottsdale Rd via Legacy Blvd giving residents quick access to the Scottsdale Airport, multiple shopping centers, trail heads into the McDowell Sonoran Preserve and down into the greater Scottsdale area. The trail located at the Northern edge of the site allows residents to connect to larger trail systems, surrounding neighborhoods, and Thompson Peak Park. Alternative means of transportation is also encouraged by providing 80 bike parking spots strategically scattered around the site.

Architectural Character, Landscaping and Site Design

- The 15 and 20 plex apartment buildings border Legacy Blvd and Miller Road with a 25'-0" setback, which creates a buffer that protects the site and allows for desert plants to line the roadways. Townhomes along Miller Road are set back more than 75'-0" allowing room for a dog park and protected outdoor amenity areas with views towards the McDowell Mountains. All buildings on the interior of the site are oriented to maintain views to the East of the mountains while simultaneously creating courtyards and outdoor nodes. Courtyards and outdoor areas feature landscaped amenities such as seating and dining areas as well as "outdoor rooms" with views that look out towards the desert landscape. The 40 plex apartment buildings create interior courtyards with fire pits and lounging areas, which will be protected from the sun during the afternoon hours. Drawing inspiration from the Sonoran Desert's wildflowers and greenery, each courtyard garden has its own distinct color theme, which is reflected through colored featured walls, furniture, structures, and flowering plants. The buildings have varied color schemes and a variety of landscaped features that help reduce repetitiveness on site. Strategic orientation and shading devices help reduce solar heat gain and protect interior spaces from excessive glare.

- The project seeks to respect and enhance the unique climate, topography, vegetation and historical context of the site and the surrounding Sonoran Desert as outlined by Scottsdale's sensitive design principles. Major vistas of the McDowell mountains have been preserved on site by incorporating a large view corridor that spans the entire site from East to West. Buildings are also oriented to create framed views of surrounding areas throughout the site. The design of the terraced pool deck and amenity areas aim to incorporate existing topography to create overlooks from key buildings such as the yoga deck at the fitness center and the outdoor room at the clubhouse. Landscaping throughout the site will use native and climate appropriate planting bringing the character of the surrounding desert onto the site. Outdoor rooms and courtyards on site are designed for human scale and provide shading, seating, play elements and fire features for use by residents. All units have private, shaded balconies or patios that extend the interior spaces into the outdoors. Rough materials such as metal, stone, and wood tone siding have been incorporated into the architectural character of the buildings on site.

Ingress, Egress, On-Site Circulation, Parking and Pedestrians

- The project has two gated vehicular entries - one off Miller Road into the townhome portion of the site and one entry off Legacy Blvd. The Legacy Blvd entry conveniently enters directly in front of the leasing building where mailboxes and parcel lockers are located. Internally all streets are connected which allows entry/exit from either vehicular gate. All parking is located inside of the fully gated site, and consists of a mixture of garages, carports, and open parking. Bike parking is scattered throughout the site for residents' use and easily spotted along the main pedestrian pathways. Extensive pedestrian walkways meander through the site and create walkable connectivity to all amenities for all residents. Perimeter fencing has key pedestrian access via keyed gates which provide security and safety for residents.

Mechanical and Utility Equipment

- Mechanical equipment on all buildings will be located on the roof or will be screened at ground level. In any case where roof equipment peaks above parapets, it will be screened from view. Mechanical equipment at ground level will be inside closets and screened by landscape or similar means. Major mechanical and utility equipment along frontage roads will be screened from both public and interior site view.

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SITE PLAN KEYNOTES

1	20'-0" FRONT SETBACK/DRAINAGE EASEMENT
2	25'-0" OPEN SPACE PEDESTRIAN ACCESS EASEMENT
3	15'-0" LANDSCAPE SETBACK
4	OPEN SPACE AMENITY FOR RESIDENTS - SEE LANDSCAPE DRAWINGS
5	DOG PARK FOR RESIDENTS
6	MAINTENANCE BUILDING W/DOG WASH
7	ELECTRONIC VEHICLE GATE
8	PEDESTRIAN GATE
9	TRASH PICK UP ZONE - SEE TRASH EXHIBIT
10	PERIMETER FENCING - SEE LANDSCAPE DRAWINGS
11	FIRE LANE TURNING RADIUS 25'-0" MIN. INSIDE RADIUS- SEE FIRE EXHIBIT
12	COVERED CAR PORT
13	9'X18' TYP. PARKING SPACE
14	9'X18' TYP. ACCESSIBLE PARKING SPACE
15	9'X18' TYP. EV PARKING SPACE
16	PROPERTY LINE
17	TRASH COMPACTOR - SEE TRASH EXHIBIT
18	OUTDOOR BIKE RACKS - SEE LANDSCAPE DRAWINGS
19	CALL BOX

Site Summary

Gross Site Area	*20.55 Acres*
Net Site Area	*18.57 Acres*
Townhome Dwelling Units	108 du
Apartment Dwelling Units	335 du
Total Dwelling Units	443 du
Gross Residential Density	21.56 Du/Ac

Plan Summary

Plan	Beds	Unit Area	Quantity	%	Total Area	Avg. Unit Size
Townhome P1	3	1,703 sf	12	2.7%		
Townhome P2	3	1,695 sf	48	10.8%		
Townhome P3	3	1,791 sf	48	10.8%		
Apartment P1A	1	754 sf	62	14.0%		
Apartment P1B	1	834 sf	66	14.9%		
Apartment P1C	1	868 sf	18	4.1%		
Apartment P1D	1	868 sf	18	4.1%		
Apartment P1E	1	883 sf	18	4.1%		
Apartment P2A	2	1,047 sf	72	16.3%		
Apartment P2B	2	1,134 sf	81	18.3%		
Total			443	100%	503,936 sf	1,138 sf

Unit Mix	Quantity	%
1 Bedroom Total	182	41.1%
2 Bedroom Total	153	34.5%
3 Bedroom Total	108	24.4%
Total	443	100.0%

Parking Summary

Parking Required	Quantity	Ratio Req'd	Spaces Req'd
1 Bed	182 du	*1.30 Spaces/Unit*	237
2 Bed	153 du	*1.70 Spaces/Unit*	261
3 Bed	108 du	*1.90 Spaces/Unit*	206
Guest	443 du	*.17 Spaces/Unit*	74
Total Req'd			778

Parking Provided	Ratio Provided	Spaces Provided
Garage Spaces		456
Carport Spaces		95
Open Spaces		239
Total Parking Provided	1.78 Spaces/Unit	790

Accessible Parking Required		Ratio Req'd	Spaces Req'd
Resident Open Spaces	500	2%	10
Guest Spaces	74	5%	4
Total Accessible Spaces Req'd			14

Accessible Parking Provided	Spaces Provided
Accessible Garages (Bldg Type C)	6
Accessible Open Parking	9
Accessible Carports	1
Total Accessible Spaces Provided	16

Bicycle Parking Req'd	1/10 Vehicle Spaces	79 Spaces

Open Space Summary

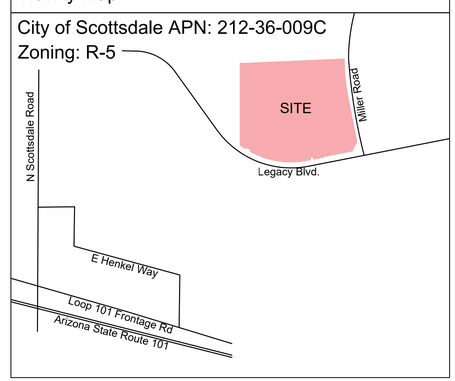
Common Open Space	Ratio	Area
Required: 34% of Net Site Area	37%	6.87 Acres
Provided:	37%	6.90 Acres

Private Open Space

Required:	Units	Ratio Req'd	Unit Area	OS Area	Avg OS per Unit
Ground Floor Units:	79	10%	85,116 sf	8,512 sf	
Upper Level Units	364	5%	418,820 sf	20,941 sf	
Total Private Open Space Required				29,453 sf	66 sf/du
Total Private Open Space Provided:				45,862 sf	104 sf/du

Vicinity Map

City of Scottsdale APN: 212-36-009C
Zoning: R-5



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LEGACY NORTH
SCOTTSDALE, AZ #2023-0044

CONCEPTUAL DESIGN
June 22, 2023

Scale: 1" = 50'-0"
0 25 50 100

SITE PLAN

A0.0



Left Elevation



Front Elevation

MATERIAL LEGEND

1	STUCCO, LIGHT SAND FINISH
2	STUCCO FASCIA TRIM, SMOOTH FINISH
3	STUCCO ACCENT, LIGHT SAND FINISH
4	VINYL WINDOWS
5	ENTRY DOOR
6	FRENCH DOOR
7	GARAGE DOOR
8	METAL AWNING
9	METAL RAILING
10	COMPOSITE RAILING
11	POST
12	SIDING
13	METAL LOUVERS / SHADING DEVICE
14	LIGHT FIXTURE
15	STONE VENEER (IF APPLICABLE)
16	UTILITY DOOR
17	ROOF MOUNTED MECH EQUIP - SCREENED FROM VIEW *

*no roof mounted equipment on townhomes



Right Elevation



Rear Elevation

COLOR LEGEND - TOWNHOMES

A	STUCCO 1: SW 7636 ORIGAMI WHITE
B	STUCCO 2: SW 7634 PEDIMENT
C	STUCCO 3: SW 7053 ADAPTIVE SHADE
D	STUCCO 4: SW 9175 DEEP FOREST BROWN
E	ENTRY DOOR: SW 6083 SABLE
F	GARAGE DOOR: SW 6083 SABLE
G	SIDING 1 - NATURAL CLAY (OR EQUAL)
H	NOT USED
I	TRIM/FASCIA /RAILING- SW 9175 DEEP FOREST BROWN
J	WINDOW FRAME: BRONZE
K	AWNING / LOUVERS: SW 2838 POLISHED MAHOGANY

*colors and materials subject to change and will be of similar manufacturer and specification

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Scale: 1/8" = 1'-0"
0 4 8 16

ELEVATIONS
Townhome - 4-Plex

A2.0



Left Elevation



Front Elevation

MATERIAL LEGEND

1	STUCCO, LIGHT SAND FINISH
2	STUCCO FASCIA TRIM, SMOOTH FINISH
3	STUCCO ACCENT, LIGHT SAND FINISH
4	VINYL WINDOWS
5	ENTRY DOOR
6	FRENCH DOOR
7	GARAGE DOOR
8	METAL AWNING
9	METAL RAILING
10	COMPOSITE RAILING
11	POST
12	SIDING
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14	LIGHT FIXTURE
15	STONE VENEER (IF APPLICABLE)
16	UTILITY DOOR
17	ROOF MOUNTED MECH EQUIP - SCREENED FROM VIEW *

*no roof mounted equipment on townhomes



Right Elevation



Rear Elevation

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Scale: 1/8" = 1'-0"
0 4 8 16

ELEVATIONS
Townhome - 5-Plex

A2.1



Front Elevation



Rear Elevation

MATERIAL LEGEND

1	STUCCO, LIGHT SAND FINISH
2	STUCCO FASCIA TRIM, SMOOTH FINISH
3	STUCCO ACCENT, LIGHT SAND FINISH
4	VINYL WINDOWS
5	ENTRY DOOR
6	FRENCH DOOR
7	GARAGE DOOR
8	METAL AWNING
9	METAL RAILING
10	COMPOSITE RAILING
11	POST
12	SIDING
13	METAL LOUVERS / SHADING DEVICE
14	LIGHT FIXTURE
15	STONE VENEER (IF APPLICABLE)
16	UTILITY DOOR
17	ROOF MOUNTED MECH EQUIP - SCREENED FROM VIEW

COLOR LEGEND - APARTMENTS

A	STUCCO 1: SW 7634 PEDIMENT
B	STUCCO 2: SW 7641 COLLONADE GRAY
C	STUCCO 3: SW 7053 ADAPTIVE SHADE
D	ACCENT STUCCO 1: SW 7510 CHATEAU BROWN
E	NOT USED
F	GARAGE DOOR: SW 7642 PAVERSTONE
G	ACCENT STUCCO 1 (15-PLEX): SW 7020 BLACK FOX
H	ACCENT STUCCO 2 (20-PLEX): SW7510 CHATEAU BROWN
I	ACCENT STUCCO 3 (40-PLEX): SW 7509 TIKI HUT
J	STONE: CYPRESS RIDGE CATANIA (OR EQUAL)
K	TRIM/FASCIA/RAILING : SW 9175 DEEP FOREST BROWN
L	AWNING / LOUVERS: SW 2838 POLISHED MAHOGANY
M	WINDOW FRAME: BRONZE
N	STUCCO 4: SW 0037 MORRIS ROOM GREY
O	GARAGE DOOR: SW 7505 MANOR HOUSE

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Scale: 1/8" = 1'-0"
0 4 8 16

ELEVATIONS
Apartments - 15-Plex

A2.2



Left Elevation



Right Elevation

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Scale: 1/8" = 1'-0"
0 4 8 16

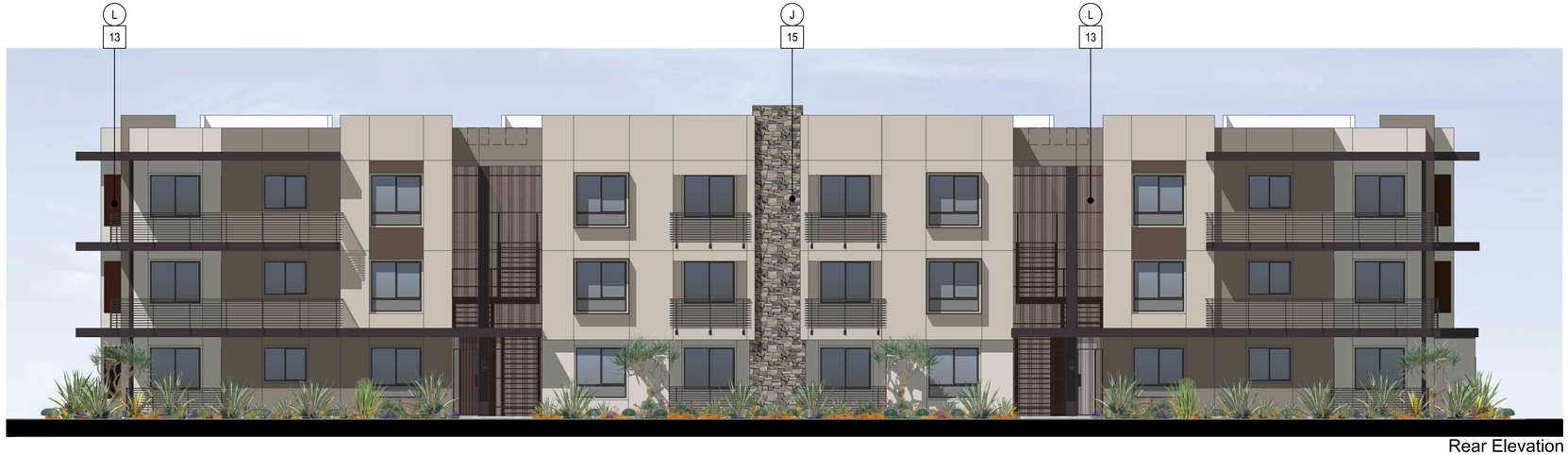
ELEVATIONS
Apartments - 15-Plex

A2.3



Front Elevation

MATERIAL LEGEND	
1	STUCCO, LIGHT SAND FINISH
2	STUCCO FASCIA TRIM, SMOOTH FINISH
3	STUCCO ACCENT, LIGHT SAND FINISH
4	VINYL WINDOWS
5	ENTRY DOOR
6	FRENCH DOOR
7	GARAGE DOOR
8	METAL AWNING
9	METAL RAILING
10	COMPOSITE RAILING
11	POST
12	SIDING
13	METAL LOUVERS / SHADING DEVICE
14	LIGHT FIXTURE
15	STONE VENEER (IF APPLICABLE)
16	UTILITY DOOR
17	ROOF MOUNTED MECH EQUIP - SCREENED FROM VIEW



Rear Elevation

COLOR LEGEND - APARTMENTS	
A	STUCCO 1: SW 7634 PEDIMENT
B	STUCCO 2: SW 7641 COLLONADE GRAY
C	STUCCO 3: SW 7053 ADAPTIVE SHADE
D	ACCENT STUCCO 1: SW 7510 CHATEAU BROWN
E	NOT USED
F	GARAGE DOOR: SW 7642 PAVERSTONE
G	ACCENT STUCCO 1 (15-PLEX): SW 7020 BLACK FOX
H	ACCENT STUCCO 2 (20-PLEX): SW7510 CHATEAU BROWN
I	ACCENT STUCCO 3 (40-PLEX): SW 7509 TIKI HUT
J	STONE: CYPRESS RIDGE CATANIA (OR EQUAL)
K	TRIM/FASCIA/RAILING : SW 9175 DEEP FOREST BROWN
L	AWNING / LOUVERS: SW 2838 POLISHED MAHOGANY
M	WINDOW FRAME: BRONZE
N	STUCCO 4: SW 0037 MORRIS ROOM GREY
O	GARAGE DOOR: SW 7505 MANOR HOUSE

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Scale: 1/8" = 1'-0"
0 4 8 16

ELEVATIONS
Apartments - 20-Plex

A2.4



Left Elevation



Right Elevation

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ELEVATIONS
Apartments - 20-Plex

A2.5



Front Elevation

MATERIAL LEGEND	
1	STUCCO, LIGHT SAND FINISH
2	STUCCO FASCIA TRIM, SMOOTH FINISH
3	STUCCO ACCENT, LIGHT SAND FINISH
4	VINYL WINDOWS
5	ENTRY DOOR
6	FRENCH DOOR
7	GARAGE DOOR
8	METAL AWNING
9	METAL RAILING
10	COMPOSITE RAILING
11	POST
12	SIDING
13	METAL LOUVERS / SHADING DEVICE
14	LIGHT FIXTURE
15	STONE VENEER (IF APPLICABLE)
16	UTILITY DOOR
17	ROOF MOUNTED MECH EQUIP - SCREENED FROM VIEW



Rear Elevation

COLOR LEGEND - APARTMENTS	
A	STUCCO 1: SW 7634 PEDIMENT
B	STUCCO 2: SW 7641 COLLONADE GRAY
C	STUCCO 3: SW 7053 ADAPTIVE SHADE
D	ACCENT STUCCO 1: SW 7510 CHATEAU BROWN
E	SIDING: MOUNTAIN CEDAR (OR EQUAL)
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Scale: 1/8" = 1'-0"
0 4 8 16

ELEVATIONS
Apartments - 40-Plex

A2.6



Left Elevation



Right Elevation

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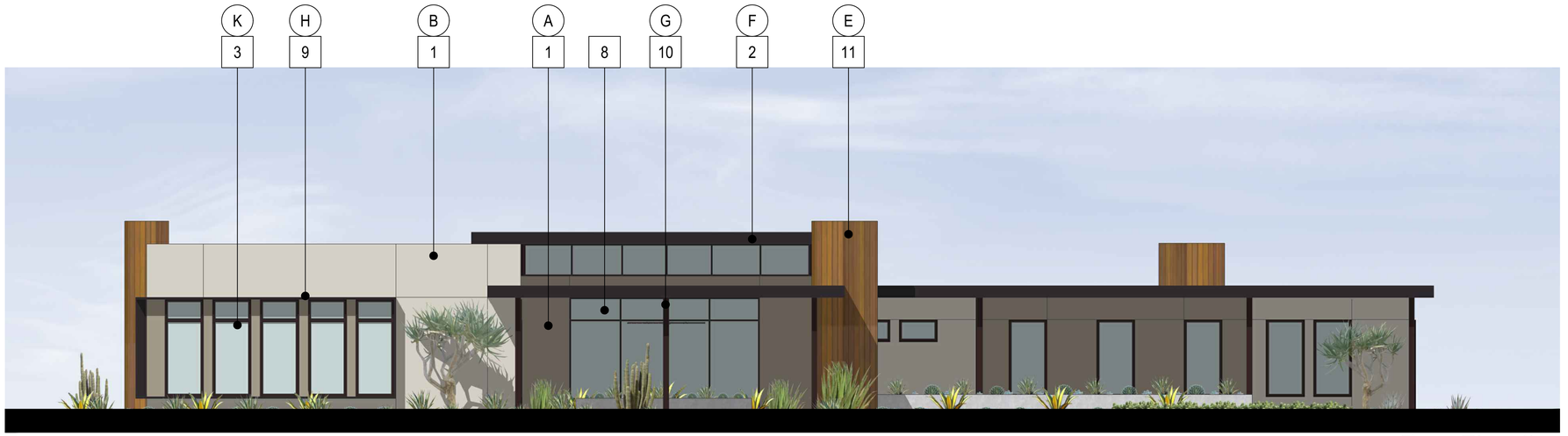
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ELEVATIONS
Apartments - 40-Plex

A2.7



Front Elevation



Rear Elevation

MATERIAL LEGEND

1	STUCCO, LIGHT SAND FINISH
2	STUCCO FASCIA TRIM, SMOOTH FINISH
3	VINYL WINDOWS
4	ENTRY DOOR
5	SLIDING DOOR
6	UTILITY DOOR
7	GARAGE DOOR
8	STOREFRONT
9	METAL AWNING
10	POST AND BEAM
11	SIDING
12	VENT PANEL
13	LIGHT FIXTURE
14	GLASS FENCE
15	TILE FINISH
16	DRINKING FOUNTAIN

COLOR LEGEND - AMENITY / FITNESS / MAINTENANCE BUILDINGS

A	STUCCO 1: SW 7504 KEYSTONE GRAY
B	STUCCO 2: SW 7036 ACCESSIBLE BEIGE
C	STUCCO 3: SW 9175 DEEP FOREST BROWN
D	UTILITY DOOR/VENT: SW 2838 POLISHED MAHOGANY
E	SIDING: MOUNTAIN CEDAR (OR EQUAL)
F	TRIM/FASCIA: SW 9175 DEEP FOREST BROWN
G	POST/BEAM: SW 2838 POLISHED MAHOGANY
H	METAL AWNING: SW 2838 POLISHED MAHOGANY
I	TILE: RENOIR GRAY SQUARE (OR EQUAL)
J	ENTRY/GARAGE DOOR: SW 2838 POLISHED MAHOGANY
K	WINDOW FRAME: BRONZE

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CONCEPTUAL DESIGN
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Scale: 3/16" = 1'-0"
0 4 8 12

ELEVATIONS
LEASING & AMENITIES

A2.8



Left Elevation



Right Elevation

MATERIAL LEGEND

1	STUCCO, LIGHT SAND FINISH
2	STUCCO FASCIA TRIM, SMOOTH FINISH
3	VINYL WINDOWS
4	ENTRY DOOR
5	SLIDING DOOR
6	UTILITY DOOR
7	GARAGE DOOR
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10	POST AND BEAM
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G	POST/BEAM: SW 2838 POLISHED MAHOGANY
H	METAL AWNING: SW 2838 POLISHED MAHOGANY
I	TILE: RENOIR GRAY SQUARE (OR EQUAL)
J	ENTRY/GARAGE DOOR: SW 2838 POLISHED MAHOGANY
K	WINDOW FRAME: BRONZE

*colors and materials subject to change and will be of similar manufacturer and specification

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ktgy.com

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Encinitas, CA | 92024

LEGACY NORTH
SCOTTSDALE, AZ #2023-0044

CONCEPTUAL DESIGN
June 22, 2023

Scale: 3/16" = 1'-0"
0 4 8 12

ELEVATIONS
LEASING & AMENITIES

A2.9



Front Elevation

MATERIAL LEGEND	
1	STUCCO, LIGHT SAND FINISH
2	STUCCO FASCIA TRIM, SMOOTH FINISH
3	VINYL WINDOWS
4	ENTRY DOOR
5	SLIDING DOOR
6	UTILITY DOOR
7	GARAGE DOOR
8	STOREFRONT
9	METAL AWNING
10	POST AND BEAM
11	SIDING
12	VENT PANEL
13	LIGHT FIXTURE
14	GLASS FENCE
15	TILE FINISH
16	DRINKING FOUNTAIN



Rear Elevation

COLOR LEGEND - AMENITY / FITNESS / MAINTENANCE BUILDINGS	
A	STUCCO 1: SW 7504 KEYSTONE GRAY
B	STUCCO 2: SW 7036 ACCESSIBLE BEIGE
C	STUCCO 3: SW 9175 DEEP FOREST BROWN
D	UTILITY DOOR/VENT: SW 2838 POLISHED MAHOGANY
E	SIDING: MOUNTAIN CEDAR (OR EQUAL)
F	TRIM/FASCIA: SW 9175 DEEP FOREST BROWN
G	POST/BEAM: SW 2838 POLISHED MAHOGANY
H	METAL AWNING: SW 2838 POLISHED MAHOGANY
I	TILE: RENOIR GRAY SQUARE (OR EQUAL)
J	ENTRY/GARAGE DOOR: SW 2838 POLISHED MAHOGANY
K	WINDOW FRAME: BRONZE

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LEGACY NORTH
SCOTTSDALE, AZ #2023-0044

CONCEPTUAL DESIGN
June 22, 2023

Scale: 3/16" = 1'-0"
0 4 8 12

ELEVATIONS
FITNESS & POOL

A2.10



Left Elevation



Right Elevation

MATERIAL LEGEND

1	STUCCO, LIGHT SAND FINISH
2	STUCCO FASCIA TRIM, SMOOTH FINISH
3	VINYL WINDOWS
4	ENTRY DOOR
5	SLIDING DOOR
6	UTILITY DOOR
7	GARAGE DOOR
8	STOREFRONT
9	METAL AWNING
10	POST AND BEAM
11	SIDING
12	VENT PANEL
13	LIGHT FIXTURE
14	GLASS FENCE
15	TILE FINISH
16	DRINKING FOUNTAIN

COLOR LEGEND - AMENITY / FITNESS / MAINTENANCE BUILDINGS

A	STUCCO 1: SW 7504 KEYSTONE GRAY
B	STUCCO 2: SW 7036 ACCESSIBLE BEIGE
C	STUCCO 3: SW 9175 DEEP FOREST BROWN
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I	TILE: RENOIR GRAY SQUARE (OR EQUAL)
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K	WINDOW FRAME: BRONZE

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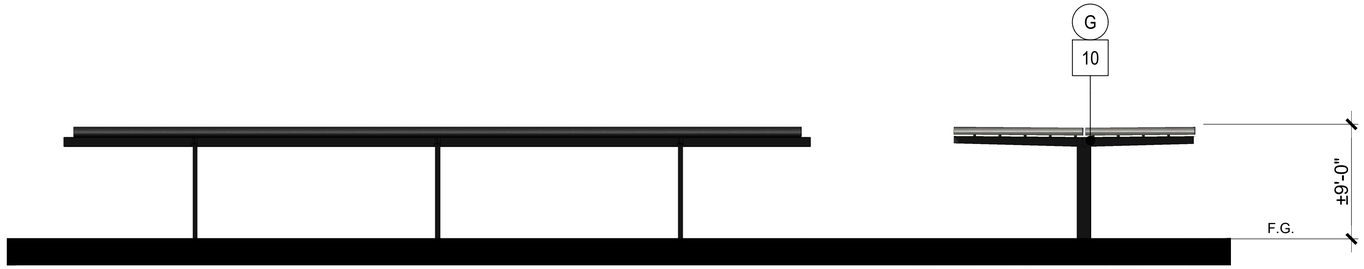
LEGACY NORTH
SCOTTSDALE, AZ #2023-0044

CONCEPTUAL DESIGN
June 22, 2023

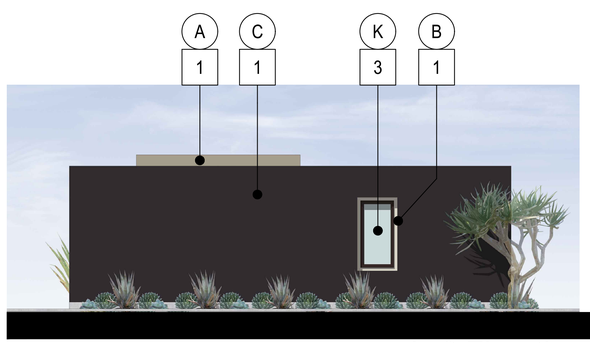
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0 4 8 12

ELEVATIONS
FITNESS & POOL

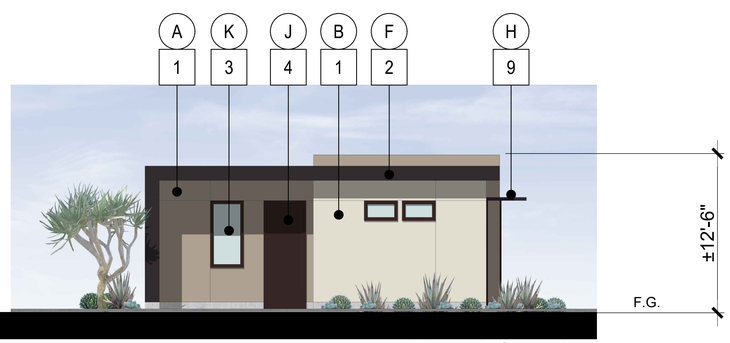
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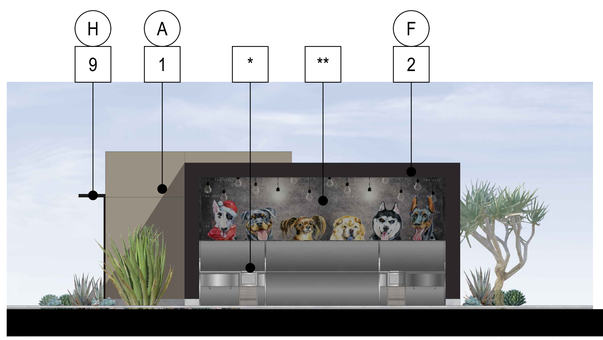
Typical Carport Elevation



Left Elevation
Maintenance & Dog Wash

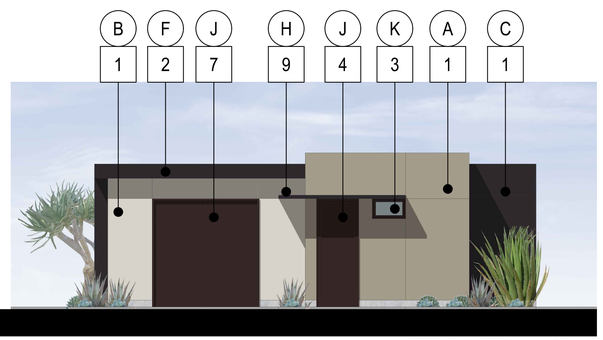


Front Elevation
Maintenance & Dog Wash



*-Dog wash station
**-Mural location by artist

Rear Elevation
Maintenance & Dog Wash



Right Elevation
Maintenance & Dog Wash

MATERIAL LEGEND

1	STUCCO, LIGHT SAND FINISH
2	STUCCO FASCIA TRIM, SMOOTH FINISH
3	VINYL WINDOWS
4	ENTRY DOOR
5	SLIDING DOOR
6	UTILITY DOOR
7	GARAGE DOOR
8	STOREFRONT
9	METAL AWNING
10	POST AND BEAM
11	SIDING
12	VENT PANEL
13	LIGHT FIXTURE
14	GLASS FENCE
15	TILE FINISH
16	DRINKING FOUNTAIN

COLOR LEGEND - AMENITY / FITNESS / MAINTENANCE BUILDINGS

A	STUCCO 1: SW 7504 KEYSTONE GRAY
B	STUCCO 2: SW 7036 ACCESSIBLE BEIGE
C	STUCCO 3: SW 9175 DEEP FOREST BROWN
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CONCEPTUAL DESIGN
June 22, 2023

Scale: 3/16" = 1'-0"
0 4 8 12

ELEVATIONS
MAINTENANCE & DOG WASH / CARPORT

A2.12



Front Perspective



Rear Perspective

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SCOTTSDALE, AZ #2023-0044

CONCEPTUAL DESIGN
June 22, 2023

NTS

PERSPECTIVES
Townhome - 4-Plex

A1.0



Front Perspective



Rear Perspective

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LEGACY NORTH
SCOTTSDALE, AZ #2023-0044

CONCEPTUAL DESIGN
June 22, 2023

NTS

PERSPECTIVES
Townhome - 5-Plex

A1.1



Front Perspective



Rear Perspective

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LEGACY NORTH
SCOTTSDALE, AZ #2023-0044

CONCEPTUAL DESIGN
June 22, 2023

NTS

PERSPECTIVES
Apartment Bldg. A - 15-Plex

A1.2



Front Perspective



Rear Perspective

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LEGACY NORTH
SCOTTSDALE, AZ #2023-0044

CONCEPTUAL DESIGN
June 22, 2023

NTS

PERSPECTIVES
Apartment Bldg. B - 20-Plex

A1.3



Front Perspective



Rear Perspective

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LEGACY NORTH
SCOTTSDALE, AZ #2023-0044

CONCEPTUAL DESIGN
June 22, 2023

NTS

PERSPECTIVES
Apartment Building C - 40-Plex

A1.4



Front Perspective



Front Perspective



Rear Perspective

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LEGACY NORTH
SCOTTSDALE, AZ #2023-0044

CONCEPTUAL DESIGN
June 22, 2023

NTS

PERSPECTIVES
LEASING / AMENITY

A1.5



Front Perspective



Front Perspective

Maintenance & Dog Wash



Front Perspective



Rear Perspective



Rear Perspective

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LEGACY NORTH
SCOTTSDALE, AZ #2023-0044

CONCEPTUAL DESIGN
June 22, 2023

NTS

PERSPECTIVES
Fitness & Pool Building / Maint. & Dog Wash

A1.6













The City of Scottsdale is situated in the beautiful Sonoran Desert, nestled in the foothill of the scenic McDowell Mountains, bristling with the tranquil vibrancy of desert plants. Both epic and intimate, the painterly natural setting unfolds outdoors in the balmy sunshine, with views unending across valleys and peaks. Bold cactus flowers perfume the air and pull you in close to marvel at the exquisite detail. Legacy North creates a timeless oasis, an enticing sanctuary, with pops of verdant color punctuating the broad brush strokes of the desert canvas.

Legacy North Scottsdale

Scottsdale, AZ

Site Area: 18.57 acres

Client

The Dinerstein Company

1010 S. Coast Highway 101, Ste 106, Encinitas, CA 92024

EPTDESIGN

14988 SAND CANYON AVE, STUDIO 8
IRVINE, CA 92618
949.502.4500
EPTDESIGN.COM

Revisions	By	Date

Job Number	E23-029
Design Staff	EC/JLR
Project Manager	VL
Principal	SC

Concept Narrative

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Plan Control: DRB Submittal
1st City Sub. June 2023

Legend

- Sunset Garden
- Sonoran Bloom Garden
- Cardinal Garden
- Desert Springs
- Mountain View Trail
- Desert Wash

Drawing inspiration from the Sonoran Desert's fascinating display of wildflowers and greenery, the landscape design introduces a series of color gardens through the site. Each garden provides its own identity through colored feature walls, furniture, structures, and flowering plants.

Characterized by vibrant and various green hues, the **Desert Springs**, displays native and arid-adapted plants in bold strokes. This central corridor offers a multitude of connected programmed spaces including a pool deck, yoga deck, outdoor lounges, dining areas, game tables and a flexible lawn.

Running east-west through the site, **Mountain View Trail** is not only a paseo to stroll through, but also a place to pause and listen. A series of garden rooms frame astonishing distant views to the mountains, while the breeze rustles the blooms of the brittlebush.

The **Desert Wash** offers a textural walkway loop dotted with towering cacti, alluring succulents, brilliant wildflowers, and rugged boulders, fitting seamlessly into the fabric of the natural surroundings.

Courtyards throughout the site are organized around three color garden typologies: the **Sunset Garden** with the vermillion cast of an evening vista, the **Sonoran Bloom Garden** showcasing the invigorating yellow burst of springtime, and the **Cardinal Garden** bringing out the warm hues of desert ores and beloved flora and fauna.



Legacy North Scottsdale

Scottsdale, AZ

Site Area: 18.57 acres

Client
The Dinerstein Company
1010 S. Coast Highway 101, Ste 106, Encinitas, CA 92024

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Design Staff	EC/JLR
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Principal	SC

Landscape Framework

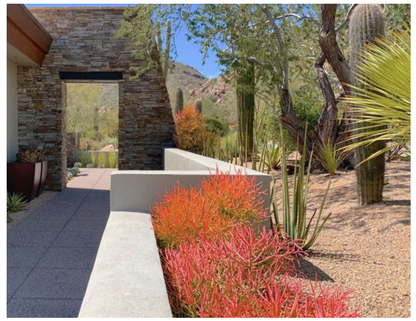
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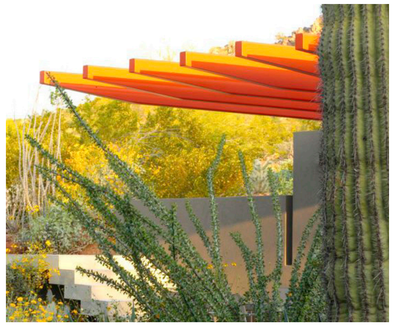
Sunset Garden


Barrel Cactus











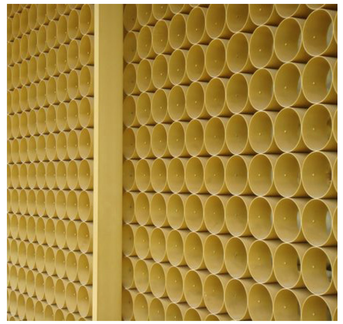




Sonoran Bloom Garden


Sonoran Desert















Legacy North Scottsdale

Scottsdale, AZ

Site Area: 18.57 acres

Client

The Dinerstein Company

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Landscape Framework Imagery

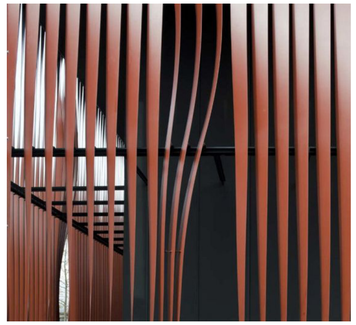
Plan Control: DRB Submittal
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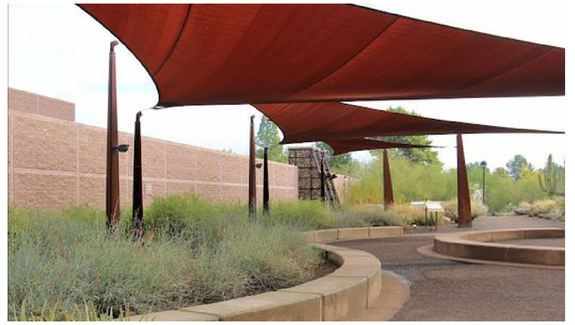
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Cardinal Garden

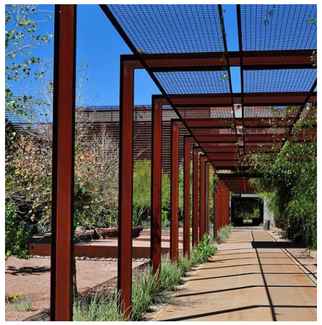
















Desert Springs















Legacy North Scottsdale

Scottsdale, AZ

Site Area: 18.57 acres

Client

The Dinerstein Company

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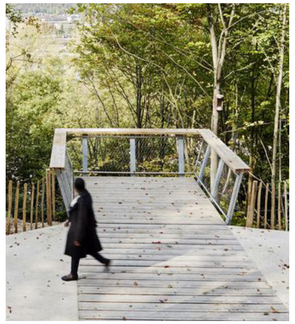
Landscape Framework Imagery

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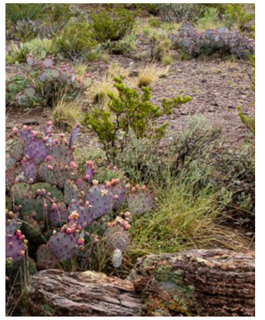
Desert Wash









Mountain View Trail










Legacy North Scottsdale

Scottsdale, AZ

Site Area: 18.57 acres

Client

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Landscape Framework Imagery

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0 25 50 100 Feet

Scale: 1" = 50'

Legacy North Scottsdale

Scottsdale, AZ

Site Area: 18.57 acres

Client

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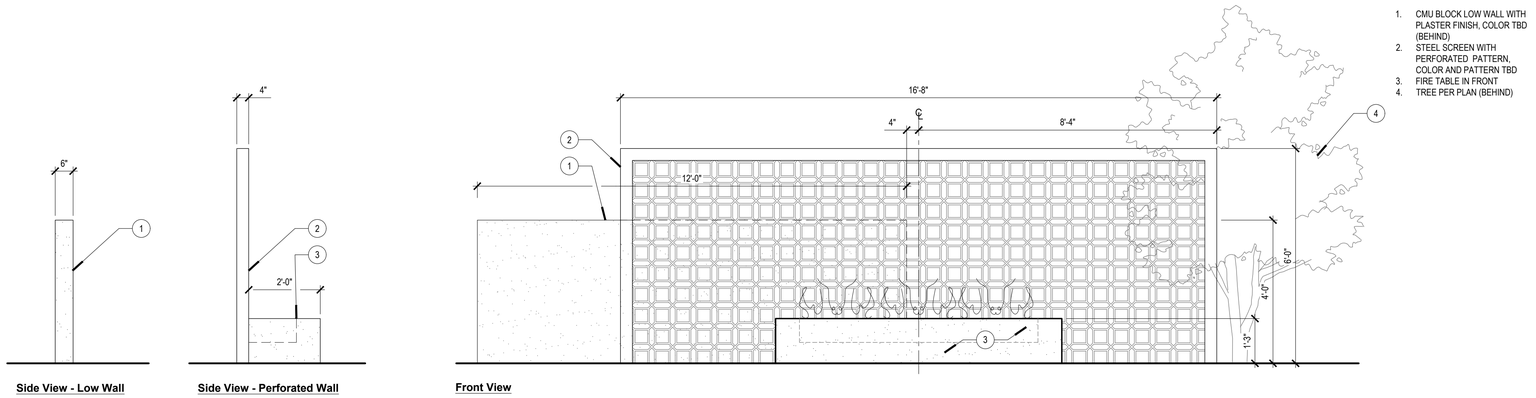
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Project Manager	VL
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Overall Plan

L0.01

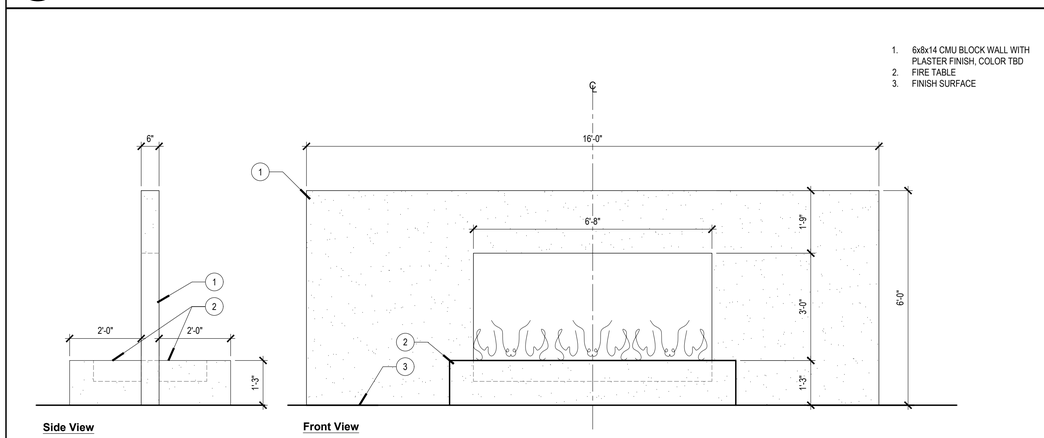
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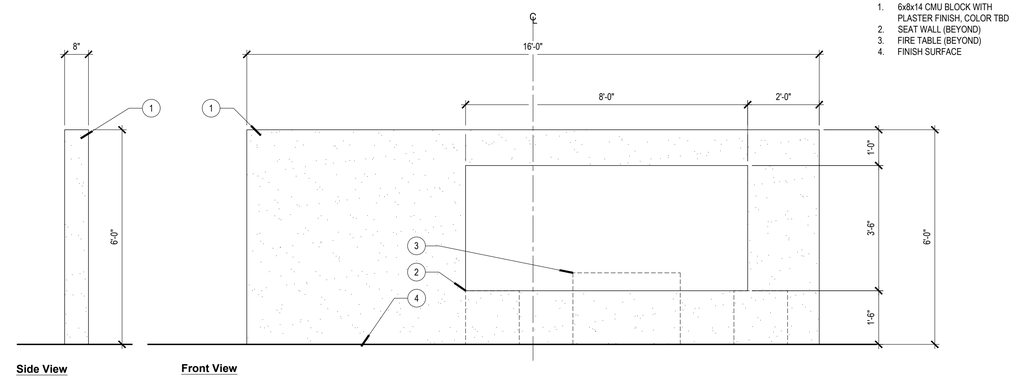
A Sonora Bloom Wall - Elevation

Scale: 1/2" = 1'-0"



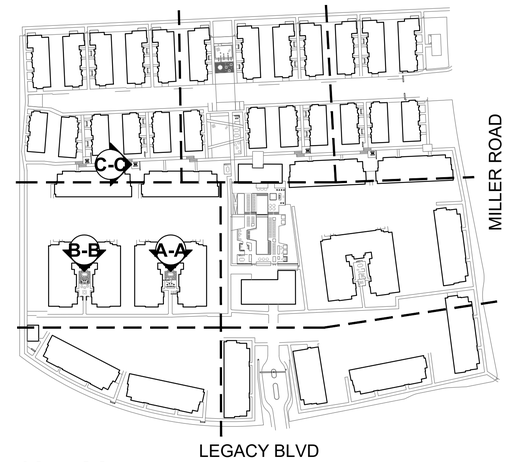
B Sunset Garden Wall - Elevation

Scale: 1/2" = 1'-0"



C Garden Room Wall - Elevation

Scale: 1/2" = 1'-0"



Key Map

Legacy North Scottsdale

Scottsdale, AZ

Site Area: 18.57 acres

Client

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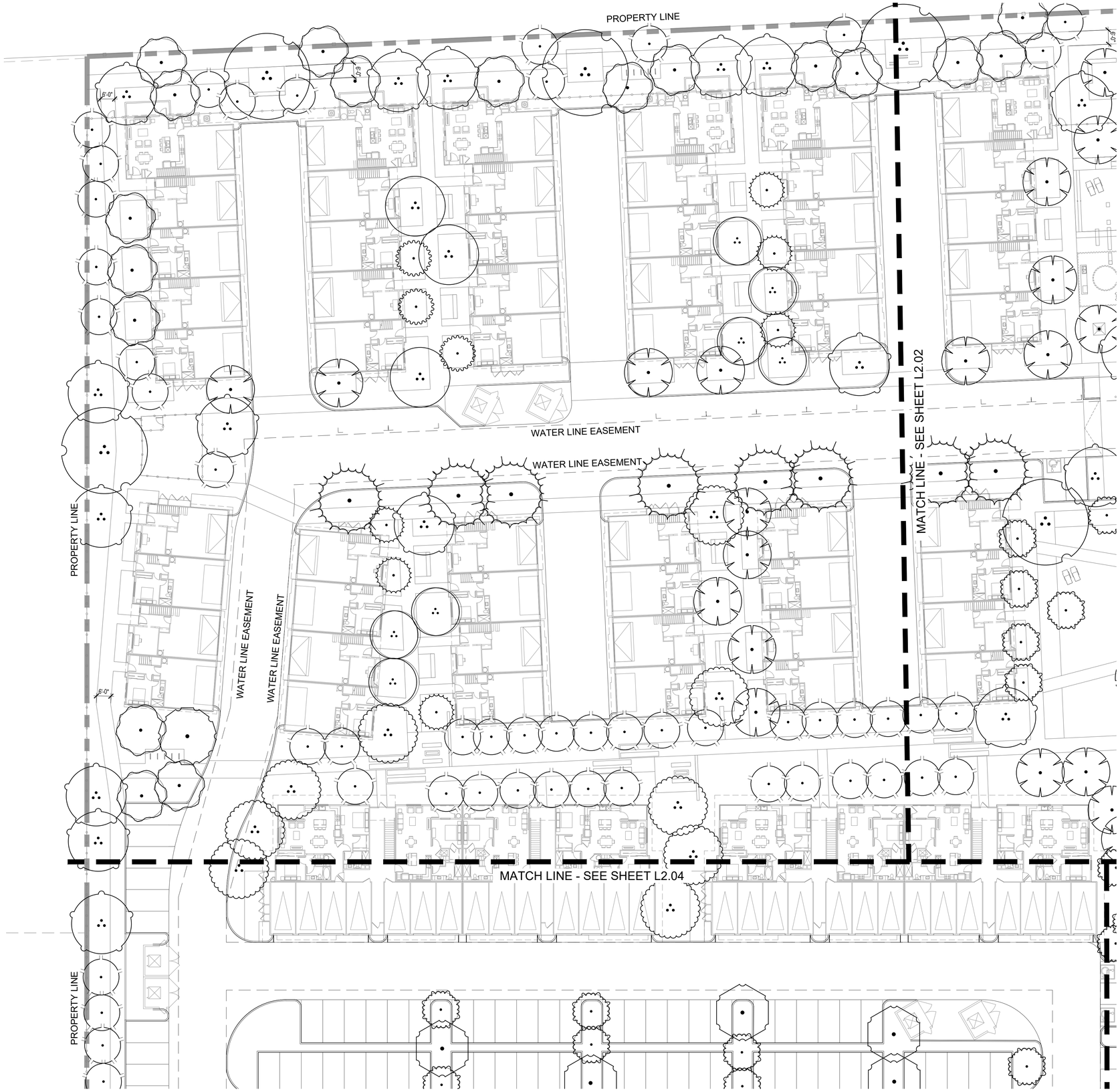
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Principal	SC

Site Details

L1.51

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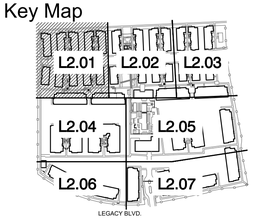
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PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE
TREES			
	ACACIA GREGGII	CATCLAW ACACIA	3" CAL. MULTI -TRUNK
	ACACIA SALICINIA	WEEPING ACACIA	3" CAL. SINGLE-TRUNK
	ACACIA WILLARDIANA	PALO BLANCO	3" CAL. SINGLE-TRUNK
	ACCA SELLOWIANA	PINEAPPLE GUAVA	3" CAL. SINGLE-TRUNK
	CERCIS CANADENSIS	EASTERN REDBUD	3" CAL. SINGLE-TRUNK
	CHILOPSIS LINEARIS 'ART'S SEEDLESS'	SEEDLESS DESERT WILLOW	3" CAL. MULTI-TRUNK
	GEIJERA PARVIFLORA	AUSTRALIAN WILLOW	4" CAL. SINGLE -TRUNK
	OLEA EUROPAEA	FRUITLESS OLIVE	3" CAL. MULTI-TRUNK
	OLNEYA TESOTA	DESERT IRONWOOD	5" CAL. MULTI-TRUNK
	PARKINSONIA 'DESERT MUSEUM'	DESERT MUSEUM PALO VERDE	5" CAL. MULTI-TRUNK
	PARKINSONIA FLORIDA	BLUE PALO VERDE	5" CAL. MULTI-TRUNK
	PROSOPIS CHILENSIS	THORNLESS CHILEAN MESQUITE	5" CAL. MULTI-TRUNK
	PROSOPIS X PHOENIX	THRONLESS MESQUITE	5" CAL. MULTI-TRUNK
	PROSOPIS VELUTINA	VELVET MESQUITE	5" CAL. MULTI-TRUNK
	SAPINDUS SAPONARIA 'DRUMMONDII'	WESTERN SOAPBERRY	3" CAL. SINGLE-TRUNK
	WASHINGTONIA FILIFERA	CALIFORNIA PALM	20' BTH

Key Map



0 5 10 20 40 Feet

Scale: 1" = 20'

Legacy North Scottsdale

Scottsdale, AZ

Site Area: 18.57 acres

Client

The Dinerstein Company

1010 S. Coast Highway 101, Ste 106, Encinitas, CA 92024

EPTDESIGN

14988 SAND CANYON AVE, STUDIO 8
IRVINE, CA 92618
949.502.4500
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Revisions	By	Date

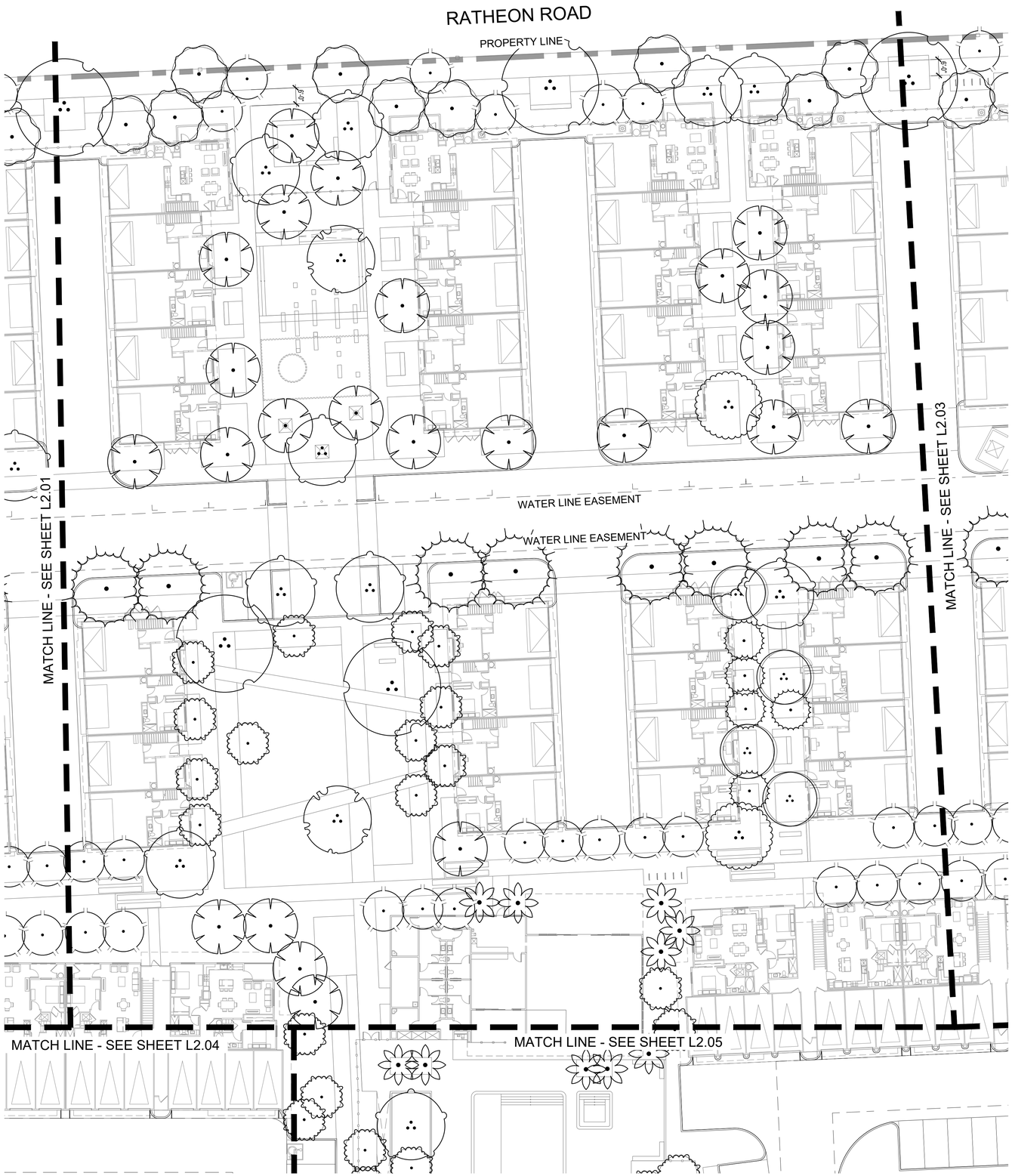
Job Number	E23-029
Design Staff	EC/JLR
Project Manager	VL
Principal	SC

Conceptual Planting Plan

L2.01

Plan Control: DRB Submittal
1st City Sub. June 2023

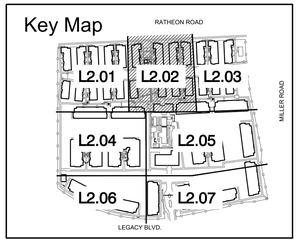
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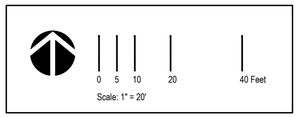


PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE
TREES			
	ACACIA GREGGII	CATCLAW ACACIA	3" CAL. MULTI -TRUNK
	ACACIA SALICINIA	WEEPING ACACIA	3" CAL. SINGLE-TRUNK
	ACACIA WILLARDIANA	PALO BLANCO	3" CAL. SINGLE-TRUNK
	ACCA SELLOWIANA	PINEAPPLE GUAVA	3" CAL. SINGLE-TRUNK
	CERCIS CANADENSIS	EASTERN REDBUD	3" CAL. SINGLE-TRUNK
	CHILOPSIS LINEARIS 'ART'S SEEDLESS'	SEEDLESS DESERT WILLOW	3" CAL. MULTI-TRUNK
	GEIJERA PARVIFLORA	AUSTRALIAN WILLOW	4" CAL. SINGLE -TRUNK
	OLEA EUROPAEA	FRUITLESS OLIVE	3" CAL. MULTI-TRUNK
	OLNEYA TESOTA	DESERT IRONWOOD	5" CAL. MULTI-TRUNK
	PARKINSONIA 'DESERT MUSEUM'	DESERT MUSEUM PALO VERDE	5" CAL. MULTI-TRUNK
	PARKINSONIA FLORIDA	BLUE PALO VERDE	5" CAL. MULTI-TRUNK
	PROSOPIS CHILENSIS	THORNLESS CHILEAN MESQUITE	5" CAL. MULTI-TRUNK
	PROSOPIS X PHOENIX	THRONLESS MESQUITE	5" CAL. MULTI-TRUNK
	PROSOPIS VELUTINA	VELVET MESQUITE	5" CAL. MULTI-TRUNK
	SAPINDUS SAPONARIA 'DRUMMONDII'	WESTERN SOAPBERRY	3" CAL. SINGLE-TRUNK
	WASHINGTONIA FILIFERA	CALIFORNIA PALM	20' BTH

Key Map





Legacy North Scottsdale

Scottsdale, AZ

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Revisions	By	Date

Job Number	E23-029
Design Staff	EC/JLR
Project Manager	VL
Principal	SC

Conceptual Planting Plan

L2.02

Plan Control: DRB Submittal
1st City Sub. June 2023

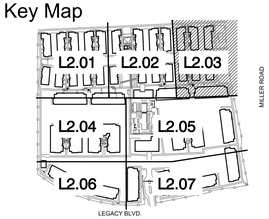
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PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE
TREES			
	ACACIA GREGGII	CATCLAW ACACIA	3" CAL. MULTI -TRUNK
	ACACIA SALICINIA	WEEPING ACACIA	3" CAL. SINGLE-TRUNK
	ACACIA WILLARDIANA	PALO BLANCO	3" CAL. SINGLE-TRUNK
	ACCA SELLOWIANA	PINEAPPLE GUAVA	3" CAL. SINGLE-TRUNK
	CERCIS CANADENSIS	EASTERN REDBUD	3" CAL. SINGLE-TRUNK
	CHILOPSIS LINEARIS 'ART'S SEEDLESS'	SEEDLESS DESERT WILLOW	3" CAL. MULTI-TRUNK
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	OLEA EUROPAEA	FRUITLESS OLIVE	3" CAL. MULTI-TRUNK
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	PARKINSONIA 'DESERT MUSEUM'	DESERT MUSEUM PALO VERDE	5" CAL. MULTI-TRUNK
	PARKINSONIA FLORIDA	BLUE PALO VERDE	5" CAL. MULTI-TRUNK
	PROSOPIS CHILENSIS	THORNLESS CHILEAN MESQUITE	5" CAL. MULTI-TRUNK
	PROSOPIS X PHOENIX	THRONLESS MESQUITE	5" CAL. MULTI-TRUNK
	PROSOPIS VELUTINA	VELVET MESQUITE	5" CAL. MULTI-TRUNK
	SAPINDUS SAPONARIA 'DRUMMONDII'	WESTERN SOAPBERRY	3" CAL. SINGLE-TRUNK
	WASHINGTONIA FILIFERA	CALIFORNIA PALM	20' BTH

Key Map



0 5 10 20 40 Feet

Scale: 1" = 20'

Legacy North Scottsdale

Scottsdale, AZ

Site Area: 18.57 acres

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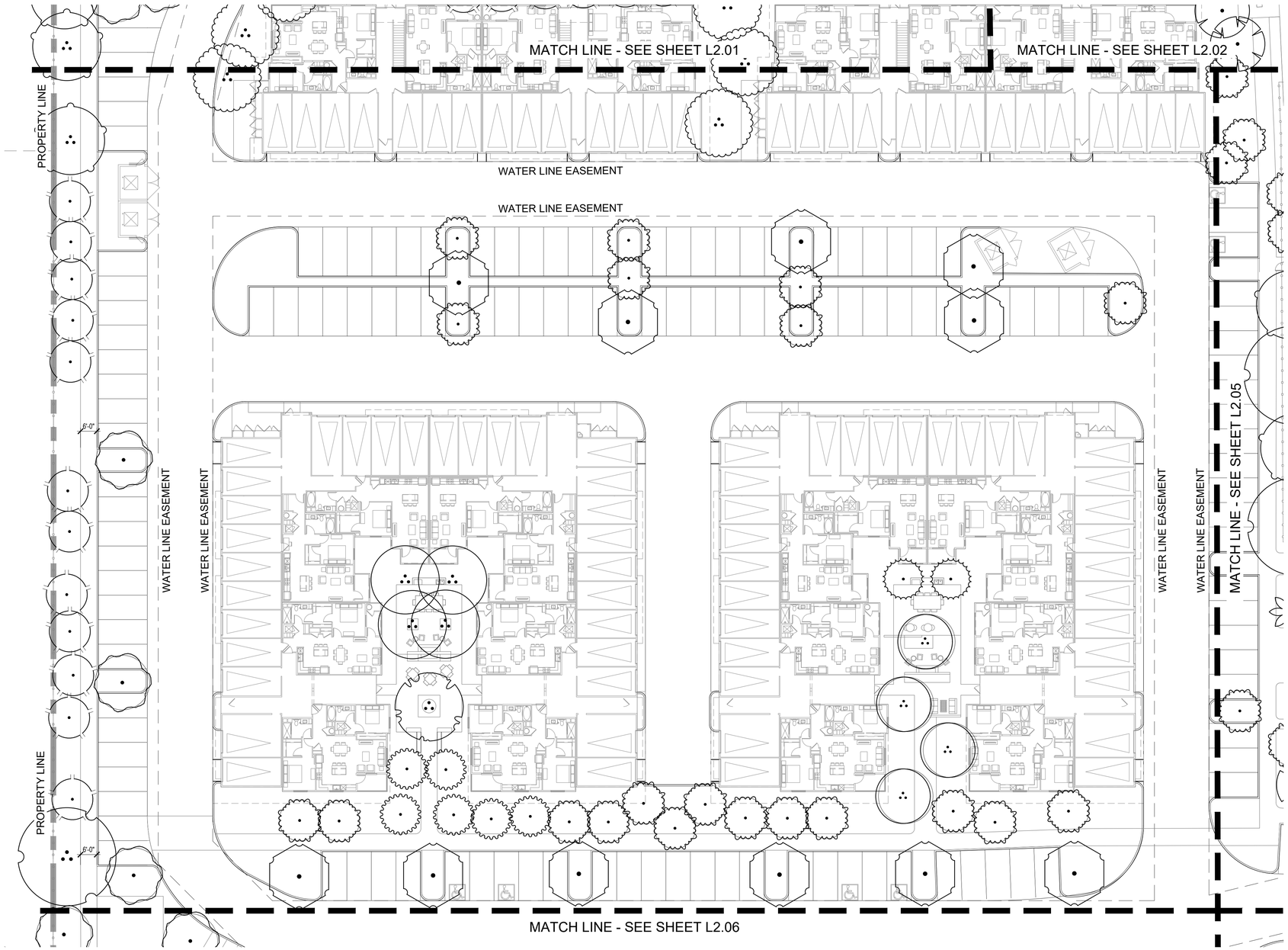
Job Number	E23-029
Design Staff	EC/JLR
Project Manager	VL
Principal	SC

Conceptual Planting Plan

L2.03

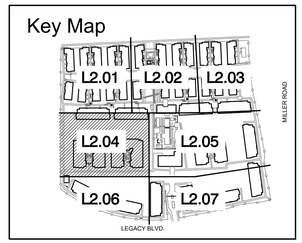
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PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE
TREES			
	ACACIA GREGGII	CATCLAW ACACIA	3" CAL. MULTI -TRUNK
	ACACIA SALICINIA	WEEPING ACACIA	3" CAL. SINGLE-TRUNK
	ACACIA WILLARDIANA	PALO BLANCO	3" CAL. SINGLE-TRUNK
	ACCA SELLOWIANA	PINEAPPLE GUAVA	3" CAL. SINGLE-TRUNK
	CERCIS CANADENSIS	EASTERN REDBUD	3" CAL. SINGLE-TRUNK
	CHILOPSIS LINEARIS 'ART'S SEEDLESS'	SEEDLESS DESERT WILLOW	3" CAL. MULTI-TRUNK
	GEIJERA PARVIFLORA	AUSTRALIAN WILLOW	4" CAL. SINGLE -TRUNK
	OLEA EUROPAEA	FRUITLESS OLIVE	3" CAL. MULTI-TRUNK
	OLNEYA TESOTA	DESERT IRONWOOD	5" CAL. MULTI-TRUNK
	PARKINSONIA 'DESERT MUSEUM'	DESERT MUSEUM PALO VERDE	5" CAL. MULTI-TRUNK
	PARKINSONIA FLORIDA	BLUE PALO VERDE	5" CAL. MULTI-TRUNK
	PROSOPIS CHILENSIS	THORNLESS CHILEAN MESQUITE	5" CAL. MULTI-TRUNK
	PROSOPIS X PHOENIX	THRONLESS MESQUITE	5" CAL. MULTI-TRUNK
	PROSOPIS VELUTINA	VELVET MESQUITE	5" CAL. MULTI-TRUNK
	SAPINDUS SAPONARIA 'DRUMMONDII'	WESTERN SOAPBERRY	3" CAL. SINGLE-TRUNK
	WASHINGTONIA FILIFERA	CALIFORNIA PALM	20' BTH



REFER TO SHEET L2.00 FOR PLANTING SCHEDULES AND NOTES

0 5 10 20 40 Feet

Scale: 1" = 20'

Legacy North Scottsdale

Scottsdale, AZ

Site Area: 18.57 acres

Client

The Dinerstein Company

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Revisions	By	Date

Job Number	E23-029
Design Staff	EC/JLR
Project Manager	VL
Principal	SC

Conceptual Planting Plan

L2.04

Plan Control: DRB Submittal
1st City Sub. June 2023

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MATCH LINE - SEE SHEET L2.02

MATCH LINE - SEE SHEET L2.03

MATCH LINE - SEE SHEET L2.04

MATCH LINE - SEE SHEET L2.07

WATER LINE EASEMENT

WATER LINE EASEMENT

WATER LINE EASEMENT

WATER LINE EASEMENT

WATER LINE EASEMENT

DRAINAGE EASEMENT

DRAINAGE EASEMENT

PROPERTY LINE

PROPERTY LINE

SITE VISIBILITY TRIANGLE

8'-0"

8'-0"

MILLER ROAD

PLANT SCHEDULE - Continued

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE
TREES			
	PROSOPIS X PHOENIX	THRONLESS MESQUITE	5" CAL. MULTI-TRUNK
	PROSOPIS VELUTINA	VELVET MESQUITE	5" CAL. MULTI-TRUNK
	SAPINDUS SAPONARIA 'DRUMMONDII'	WESTERN SOAPBERRY	3" CAL. SINGLE-TRUNK
	WASHINGTONIA FILIFERA	CALIFORNIA PALM	20' BTH

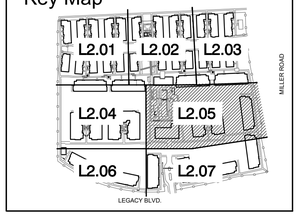
PLANT SCHEDULE - Continued

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE
TREES			
	GEIJERA PARVIFLORA	AUSTRALIAN WILLOW	4" CAL. SINGLE -TRUNK
	OLEA EUROPAEA	FRUITLESS OLIVE	3" CAL. MULTI-TRUNK
	OLNEYA TESOTA	DESERT IRONWOOD	5" CAL. MULTI-TRUNK
	PARKINSONIA 'DESERT MUSEUM'	DESERT MUSEUM PALO VERDE	5" CAL. MULTI-TRUNK
	PARKINSONIA FLORIDA	BLUE PALO VERDE	5" CAL. MULTI-TRUNK
	PROSOPIS CHILENSIS	THORNLESS CHILEAN MESQUITE	5" CAL. MULTI-TRUNK

PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE
TREES			
	ACACIA GREGGII	CATCLAW ACACIA	3" CAL. MULTI -TRUNK
	ACACIA SALICINIA	WEEPING ACACIA	3" CAL. SINGLE-TRUNK
	ACACIA WILLARDIANA	PALO BLANCO	3" CAL. SINGLE-TRUNK
	ACCA SELLOWIANA	PINEAPPLE GUAVA	3" CAL. SINGLE-TRUNK
	CERCIS CANADENSIS	EASTERN REDBUD	3" CAL. SINGLE-TRUNK
	CHILOPSIS LINEARIS 'ART'S SEEDLESS'	SEEDLESS DESERT WILLOW	3" CAL. MULTI-TRUNK

Key Map



0 5 10 20 40 Feet

Scale: 1" = 20'

Legacy North Scottsdale

Scottsdale, AZ

Site Area: 18.57 acres

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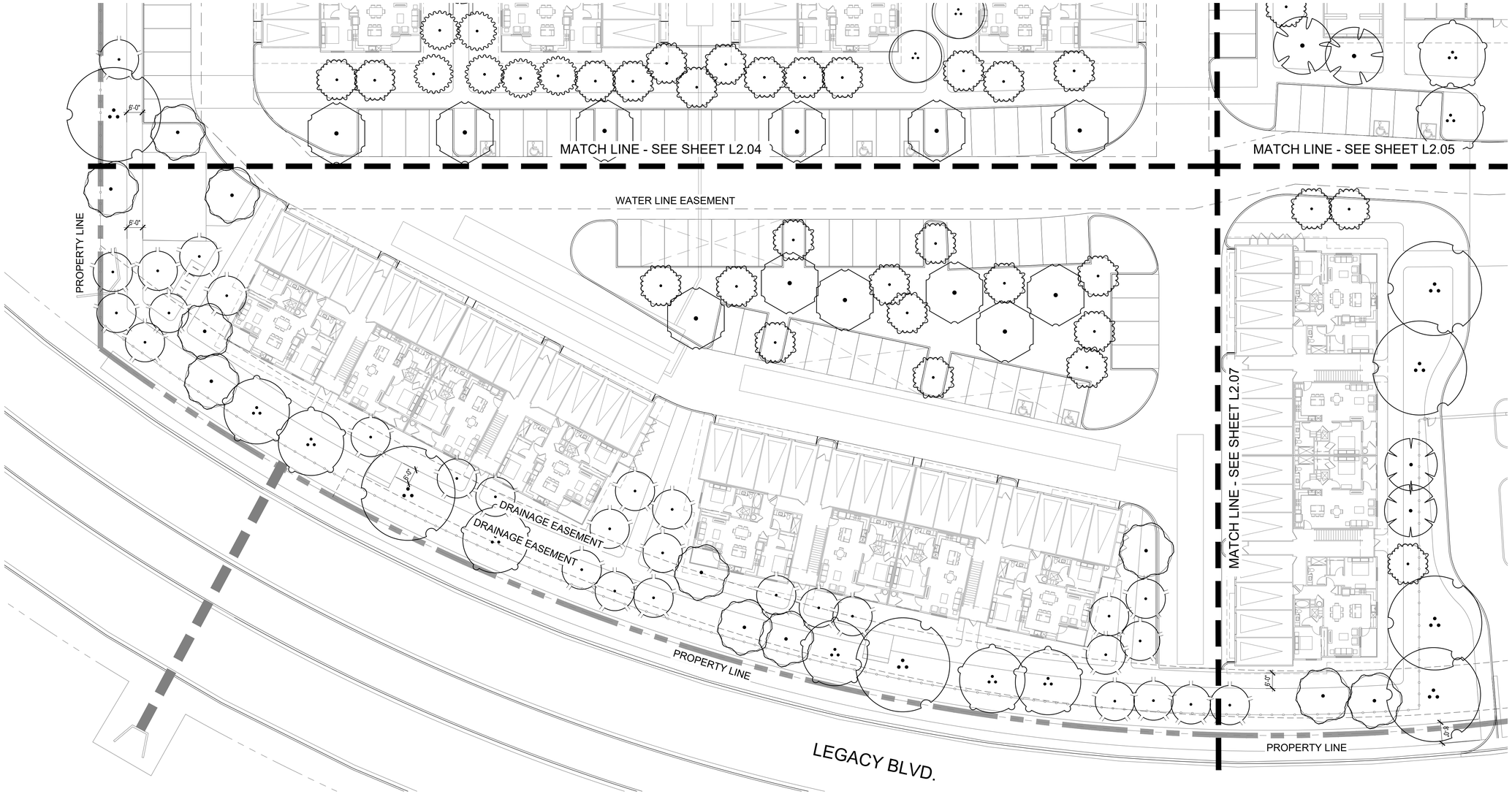
Job Number	E23-029
Design Staff	EC/JLR
Project Manager	VL
Principal	SC

Conceptual Planting Plan

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PLANT SCHEDULE - Continued

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE
TREES			
	PROSOPIS X PHOENIX	THRONLESS MESQUITE	5" CAL. MULTI-TRUNK
	PROSOPIS VELUTINA	VELVET MESQUITE	5" CAL. MULTI-TRUNK
	SAPINDUS SAPONARIA 'DRUMMONDII'	WESTERN SOAPBERRY	3" CAL. SINGLE-TRUNK
	WASHINGTONIA FILIFERA	CALIFORNIA PALM	20' BTH

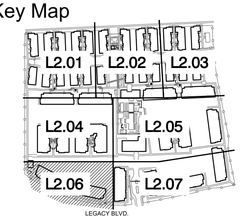
PLANT SCHEDULE - Continued

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE
TREES			
	GEIJERA PARVIFLORA	AUSTRALIAN WILLOW	4" CAL. SINGLE -TRUNK
	OLEA EUROPAEA	FRUITLESS OLIVE	3" CAL. MULTI-TRUNK
	OLNEYA TESOTA	DESERT IRONWOOD	5" CAL. MULTI-TRUNK
	PARKINSONIA 'DESERT MUSEUM'	DESERT MUSEUM PALO VERDE	5" CAL. MULTI-TRUNK
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	PROSOPIS CHILENSIS	THORNLESS CHILEAN MESQUITE	5" CAL. MULTI-TRUNK

PLANT SCHEDULE

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Key Map





Legacy North Scottsdale

Scottsdale, AZ

Site Area: 18.57 acres

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Revisions	By	Date

Job Number	E23-029
Design Staff	EC/JLR
Project Manager	VL
Principal	SC

Conceptual Planting Plan

L2.06

Plan Control: DRB Submittal
1st City Sub. June 2023

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PLANT SCHEDULE - Continued

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE
TREES			
	PROSOPIS X PHOENIX	THRONLESS MESQUITE	5" CAL. MULTI-TRUNK
	PROSOPIS VELUTINA	VELVET MESQUITE	5" CAL. MULTI-TRUNK
	SAPINDUS SAPONARIA 'DRUMMONDII'	WESTERN SOAPBERRY	3" CAL. SINGLE-TRUNK
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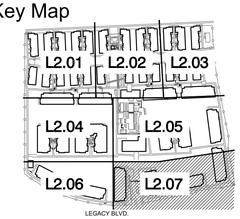
PLANT SCHEDULE - Continued

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE
TREES			
	GEIJERA PARVIFLORA	AUSTRALIAN WILLOW	4" CAL. SINGLE -TRUNK
	OLEA EUROPAEA	FRUITLESS OLIVE	3" CAL. MULTI-TRUNK
	OLNEYA TESOTA	DESERT IRONWOOD	5" CAL. MULTI-TRUNK
	PARKINSONIA 'DESERT MUSEUM'	DESERT MUSEUM PALO VERDE	5" CAL. MULTI-TRUNK
	PARKINSONIA FLORIDA	BLUE PALO VERDE	5" CAL. MULTI-TRUNK
	PROSOPIS CHILENSIS	THORNLESS CHILEAN MESQUITE	5" CAL. MULTI-TRUNK

PLANT SCHEDULE

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TREES			
	ACACIA GREGGII	CATCLAW ACACIA	3" CAL. MULTI -TRUNK
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	ACACIA WILLARDIANA	PALO BLANCO	3" CAL. SINGLE-TRUNK
	ACCA SELLOWIANA	PINEAPPLE GUAVA	3" CAL. SINGLE-TRUNK
	CERCIS CANADENSIS	EASTERN REDBUD	3" CAL. SINGLE-TRUNK
	CHILOPSIS LINEARIS 'ART'S SEEDLESS'	SEEDLESS DESERT WILLOW	3" CAL. MULTI-TRUNK

Key Map



0 5 10 20 40 Feet

Scale: 1" = 20'

Legacy North Scottsdale

Scottsdale, AZ

Site Area: 18.57 acres

Client

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Revisions	By	Date

Job Number	E23-029
Design Staff	EC/JLR
Project Manager	VL
Principal	SC

Conceptual Planting Plan

L2.07

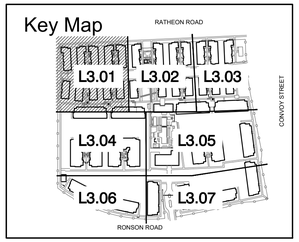
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ACCENT, SHRUB AND GROUND COVER			
	ABUTILON PALMERI	PALMER INDIAN MALLOW	10 GAL
	AGAVE ATTENUATA 'BOUTIN BLUE'	BLUE FOX TAIL AGAVE	15 GAL
	AGAVE PARRYI ' TRUNCATA'	ARTICHOKE AGAVE	5 GAL
	AGAVE 'SHARKSKIN SHOES'	SHARKSKIN AGAVE	15 GAL
	AGAVE WEBERI 'ARIZONA STAR'	WEBER AGAVE	15 GAL
	ALOE X 'BLUE ELF'	BLUE ELF ALOE	5 GAL
	ALOE 'SAFARI ORANGE'	ORANGE ALOE	5 GAL
	AMBROSIA DUMOSA	BURROBUSH	10 GAL
	ARTEMISIA LUDOVICIANA SPP. 'ALBULA'	SILVER WORMWOOD	10 GAL
	BACCHARIS X 'STARN' THOMPSON	THOMPSON BROOM	5 GAL
	BAILYEA MULTIRADIATA	DESERT MARIGOLD	5 GAL
	BOUTELOUA GRACILIS	BLUE GRAMA	5 GAL
	CYLINDROPUNTIA BIGELOVII	TEDDY-BEAR CHOLLA	5 GAL
	DALEA FRUTESCENS	BLACK PRAIRIE CLOVER	10 GAL
	ECHINOCACTUS GRUSONII	GOLDEN BARREL CACTUS	15 GAL
	ENCELIA FARINOSA	BRITTLE BUSH	10 GAL
	FOUQUIERIA SPLENDENS	OCOTILLO	15 GAL
	HESPERALOE PARVIFLORA 'BRAKELIGHTS'	RED YUCCA	5 GAL
	HESPERALOE PARVIFLORA 'YELLOW'	YELLOW YUCCA	5 GAL
	JUSTICIA CANDICANS	RED JUSTICIA	5 GAL
	MUHLENBERGIA RIGENS	DEERGRASS	10 GAL
	OPUTINIA SANTA-RITA	SANTA RITA PRICKLYPEAR	15 GAL
	PACHYCEREUS MARGINATUS	MEXICAN FENCE POST	30 GAL
	PENSTEMON PARRYI	PARRY'S PENSTEMON	15 GAL
	SALVIA LEUCANTHA	MEXICAN BUSH SAGE	10 GAL
	SANTOLINA CHAMAECYPARISSUS	LAVENDER COTTON	10 GAL
	SENECIO BICOLOR SPP. CINERARIA	DUSTY MILLER	10 GAL
	SPHAERALCEA AMBIGUA	DESERT MALLOW	10 GAL
	SPOROBOLUS AIROIDES	ALKALI SACATAN	5 GAL

NOTE: DECOMPOSED GRANITE MUCH IN ALL PLANTING AREAS 2" DEPTH. COLOR TBD.



REFER TO SHEET L2.00 FOR PLANTING SCHEDULES AND NOTES

0 5 10 20 40 Feet

Scale: 1" = 20'

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Scottsdale, AZ

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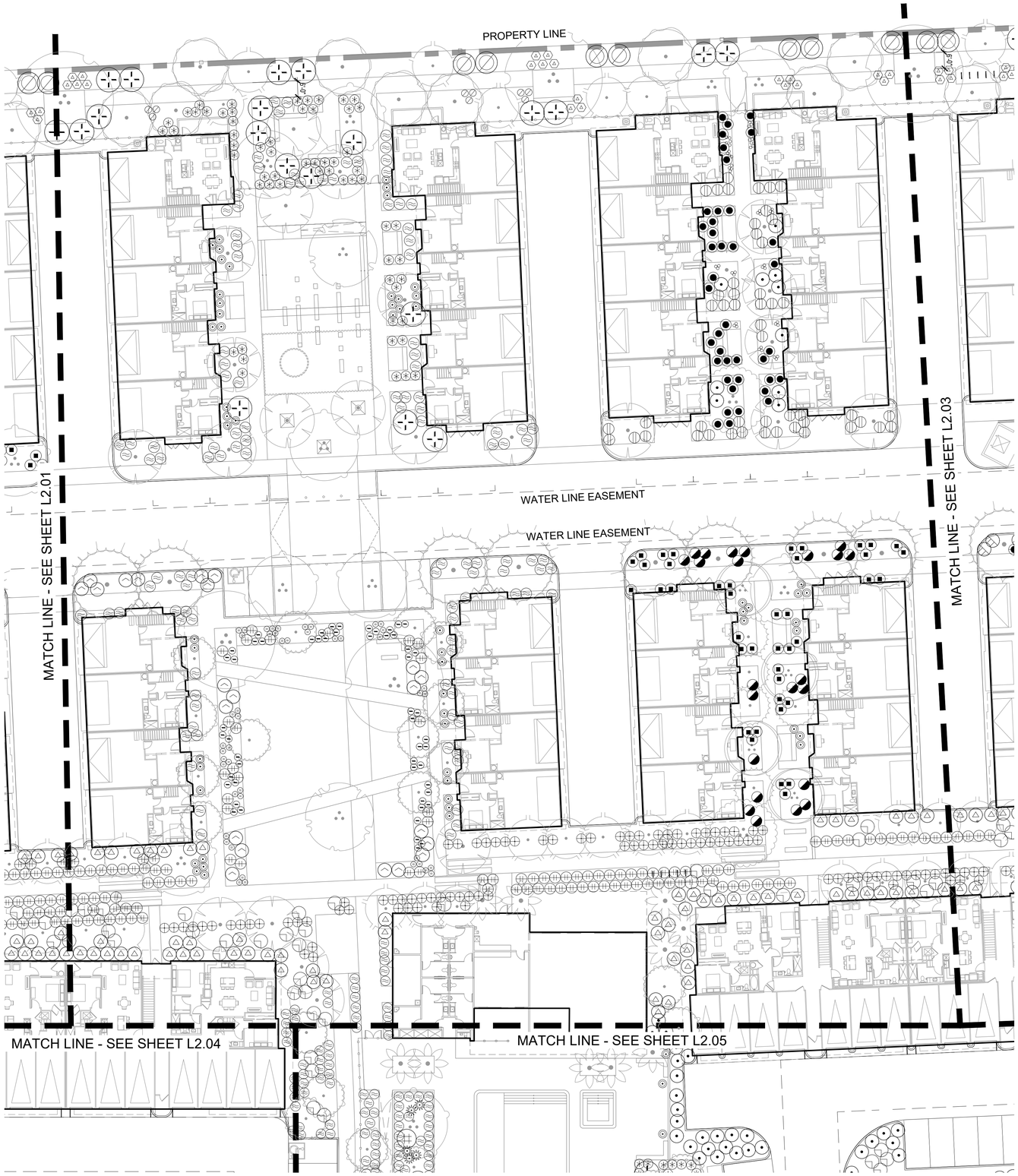
Job Number	E23-029
Design Staff	EC/JLR
Project Manager	VL
Principal	SC

Conceptual Planting Plan

L3.01

Plan Control: DRB Submittal
1st City Sub. June 2023

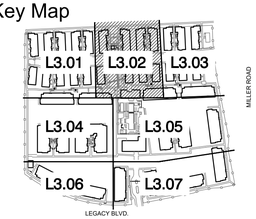
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ACCENT, SHRUB AND GROUND COVER			
	ABUTILON PALMERI	PALMER INDIAN MALLOW	10 GAL
	AGAVE ATTENUATA 'BOUTIN BLUE'	BLUE FOX TAIL AGAVE	15 GAL
	AGAVE PARRYI ' TRUNCATA'	ARTICHOKE AGAVE	5 GAL
	AGAVE 'SHARKSKIN SHOES'	SHARKSKIN AGAVE	15 GAL
	AGAVE WEBERI 'ARIZONA STAR'	WEBER AGAVE	15 GAL
	ALOE X 'BLUE ELF'	BLUE ELF ALOE	5 GAL
	ALOE 'SAFARI ORANGE'	ORANGE ALOE	5 GAL
	AMBROSIA DUMOSA	BURROBUSH	10 GAL
	ARTEMISIA LUDOVICIANA SPP. 'ALBULA'	SILVER WORMWOOD	10 GAL
	BACCHARIS X 'STARN' THOMPSON	THOMPSON BROOM	5 GAL
	BAILYEA MULTIRADIATA	DESERT MARIGOLD	5 GAL
	BOUTELOUA GRACILIS	BLUE GRAMA	5 GAL
	CYLINDROPUNTIA BIGELOVII	TEDDY-BEAR CHOLLA	5 GAL
	DALEA FRUTESCENS	BLACK PRAIRIE CLOVER	10 GAL
	ECHINOCACTUS GRUSONII	GOLDEN BARREL CACTUS	15 GAL
	ENCELIA FARINOSA	BRITTLE BUSH	10 GAL
	FOUQUIERIA SPLENDENS	OCOTILLO	15 GAL
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	HESPERALOE PARVIFLORA 'YELLOW'	YELLOW YUCCA	5 GAL
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	OPUTINIA SANTA-RITA	SANTA RITA PRICKLYPEAR	15 GAL
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	SALVIA LEUCANTHA	MEXICAN BUSH SAGE	10 GAL
	SANTOLINA CHAMAECYPARISSUS	LAVENDER COTTON	10 GAL
	SENECIO BICOLOR SPP. CINERARIA	DUSTY MILLER	10 GAL
	SPHAERALCEA AMBIGUA	DESERT MALLOW	10 GAL
	SPOROBOLUS AIROIDES	ALKALI SACATAN	5 GAL

NOTE: DECOMPOSED GRANITE MUCH IN ALL PLANTING AREAS 2" DEPTH. COLOR TBD.

Key Map



0 5 10 20 40 Feet

Scale: 1" = 20'

Legacy North Scottsdale

Scottsdale, AZ

Site Area: 18.57 acres

Client

The Dinerstein Company

1010 S. Coast Highway 101, Ste 106, Encinitas, CA 92024

EPTDESIGN

14988 SAND CANYON AVE, STUDIO 8
IRVINE, CA 92618
949.502.4500
EPTDESIGN.COM

Revisions	By	Date

Job Number	E23-029
Design Staff	EC/JLR
Project Manager	VL
Principal	SC

Conceptual Planting Plan

L3.02

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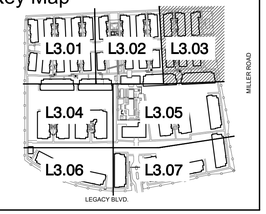
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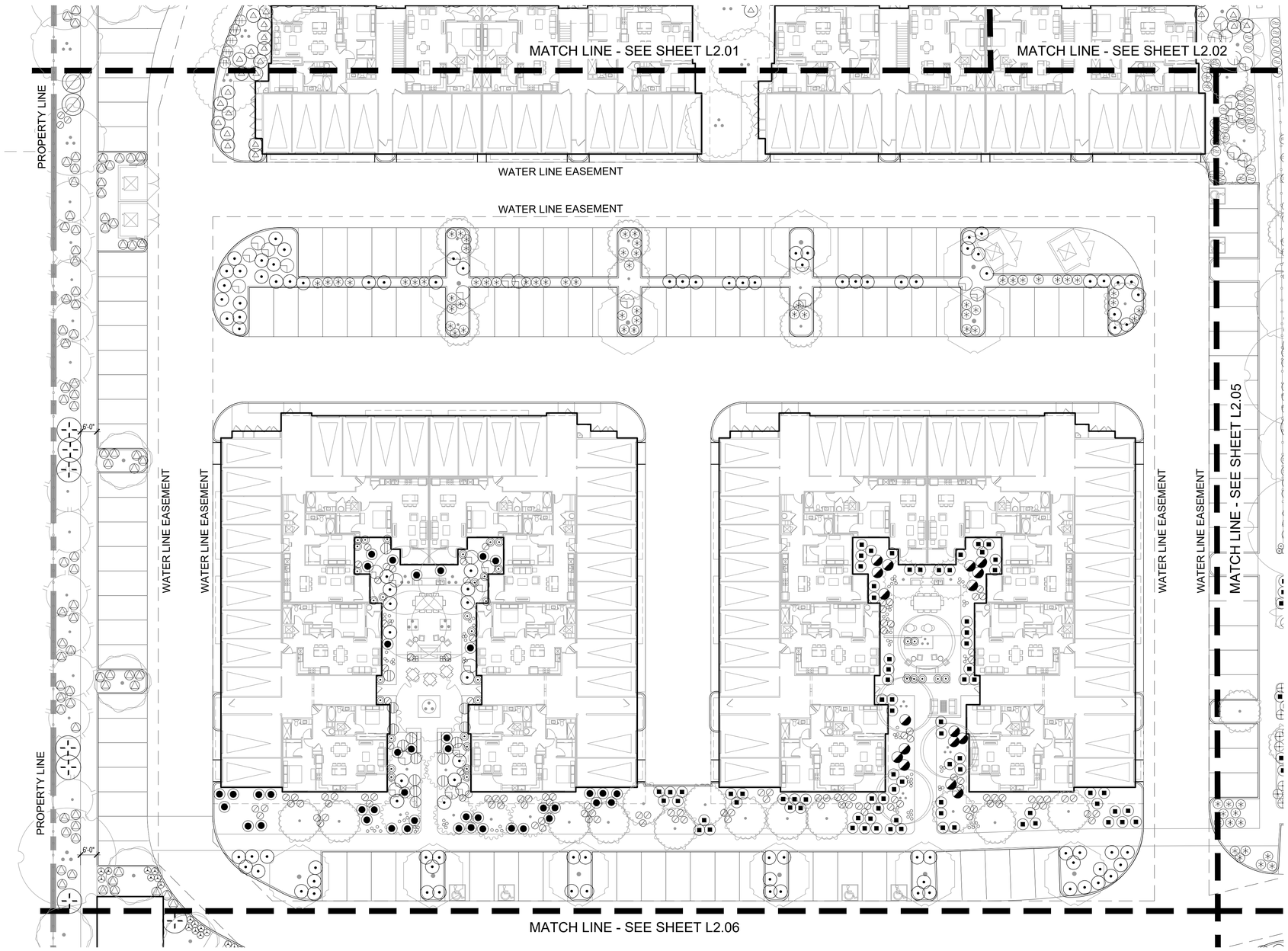
Job Number	E23-029
Design Staff	EC/JLR
Project Manager	VL
Principal	SC

Conceptual Planting Plan

L3.03

Plan Control: DRB Submittal
1st City Sub. June 2023

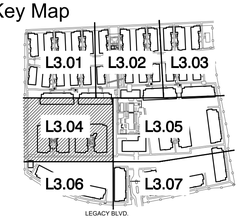
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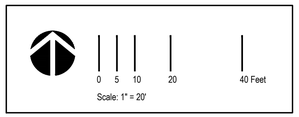


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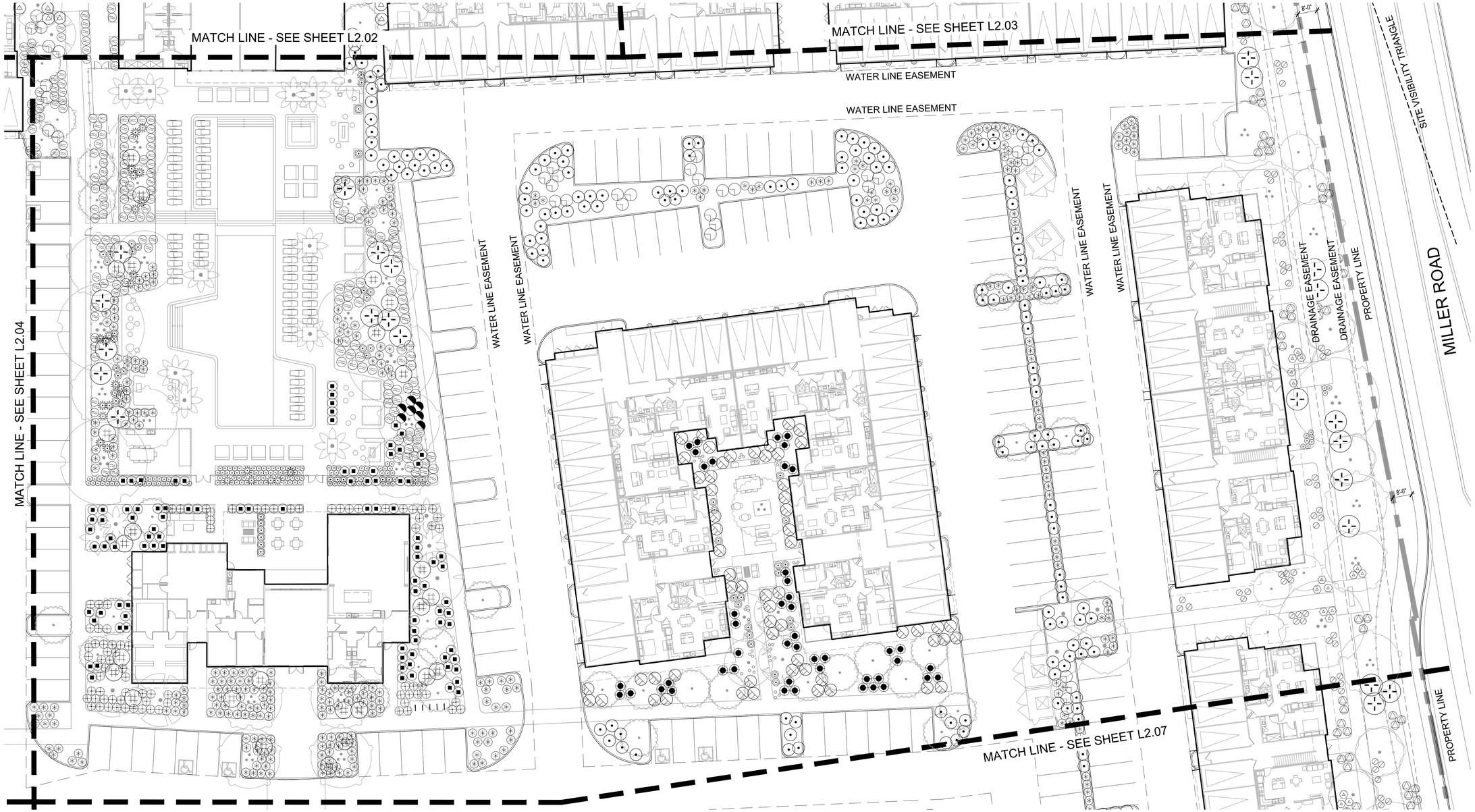
Job Number	E23-029
Design Staff	EC/JLR
Project Manager	VL
Principal	SC

Conceptual Planting Plan

L3.04

Plan Control: DRB Submittal
1st City Sub. June 2023

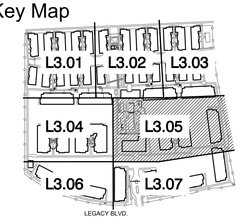
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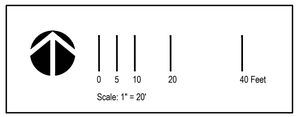


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	ENCELIA FARINOSA	BRITTLE BUSH	10 GAL
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Key Map





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Scottsdale, AZ

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Revisions	By	Date

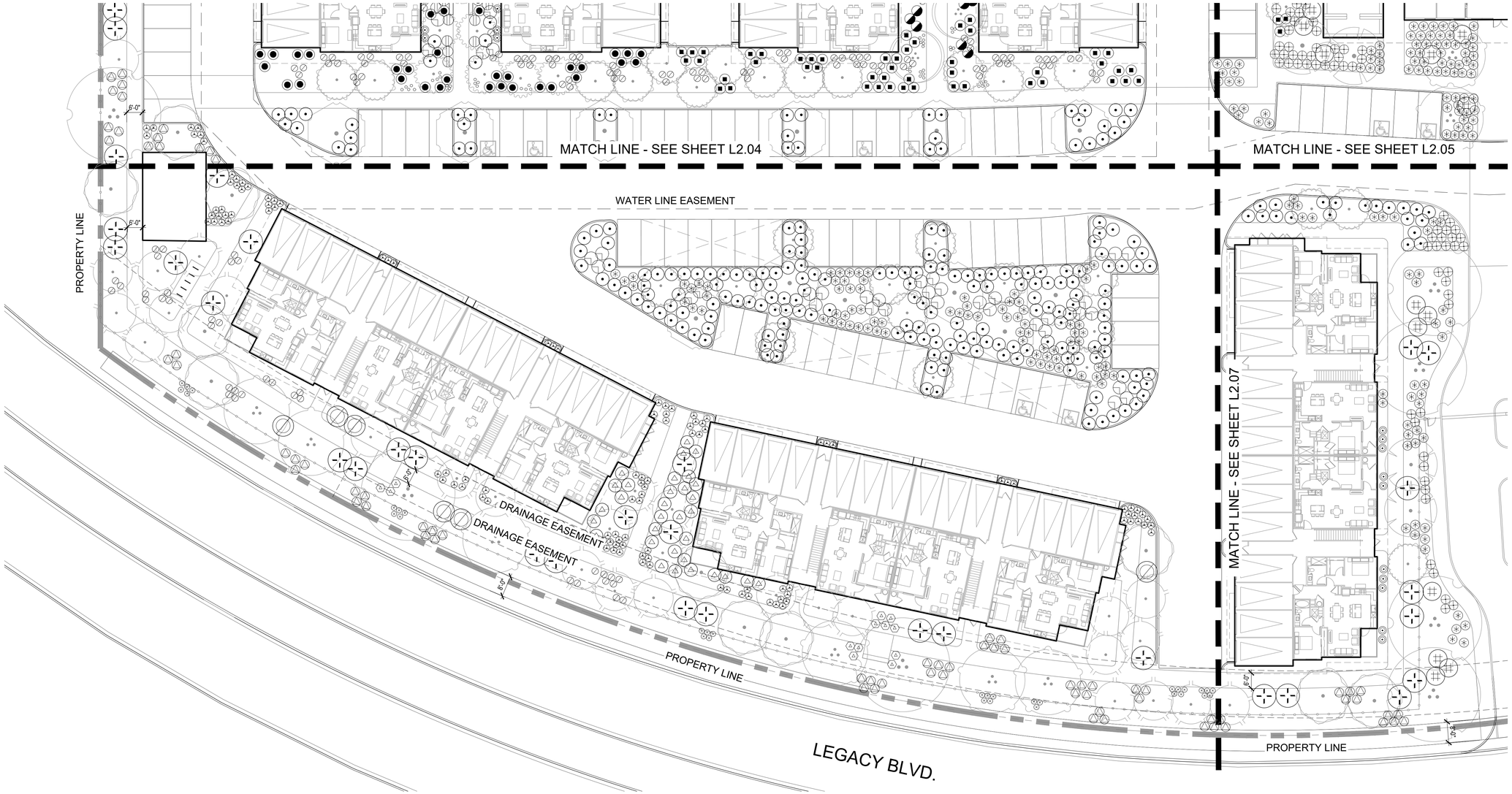
Job Number	E23-029
Design Staff	EC/JLR
Project Manager	VL
Principal	SC

Conceptual Planting Plan

L3.05

Plan Control: DRB Submittal
1st City Sub. June 2023

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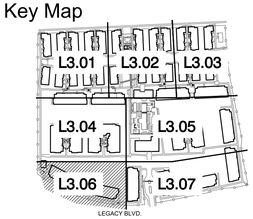
ACCENT, SHRUB AND GROUND COVER - Continued

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ACCENT, SHRUB AND GROUND COVER

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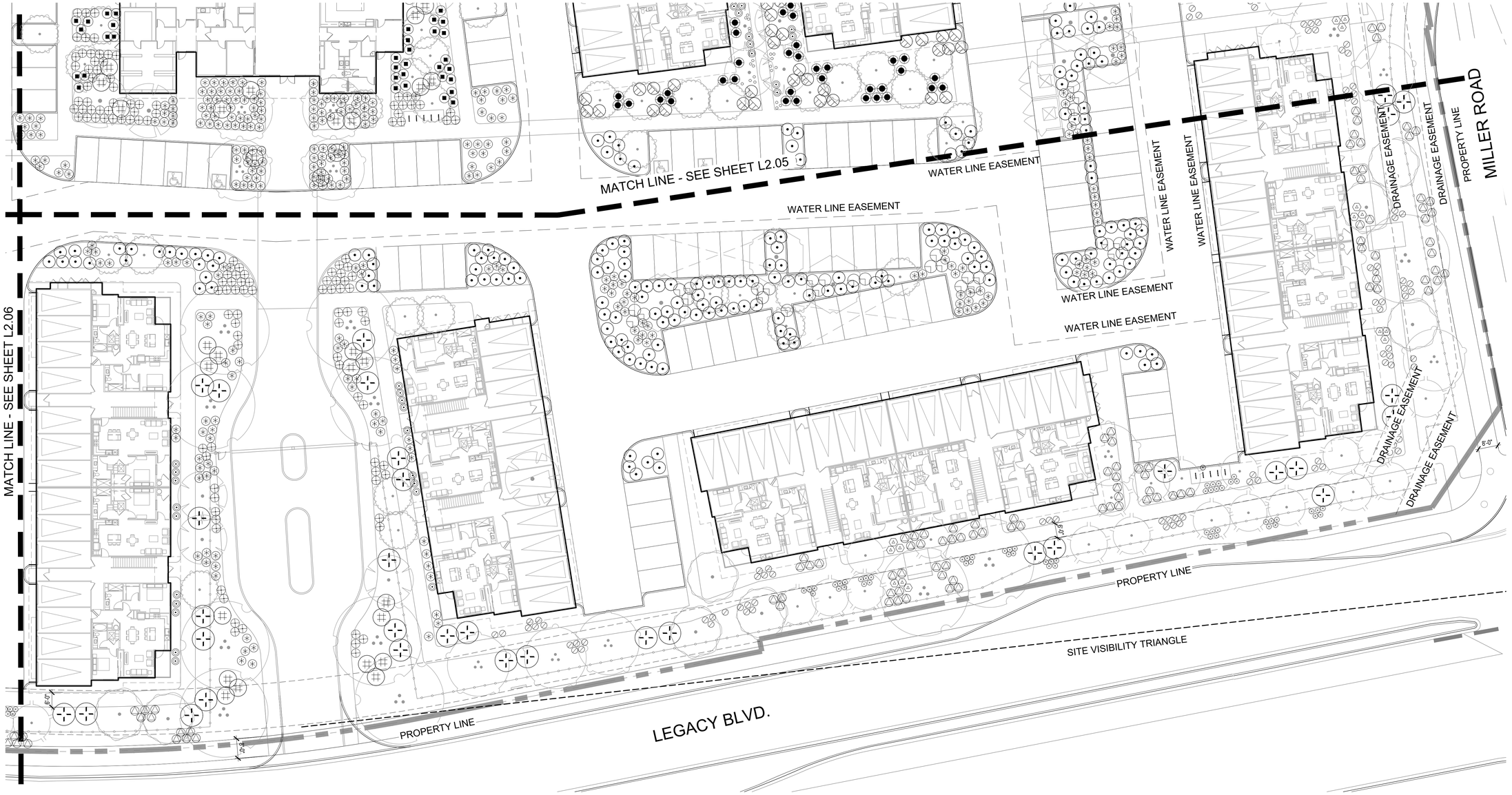
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Design Staff	EC/JLR
Project Manager	VL
Principal	SC

Conceptual Planting Plan

L3.06

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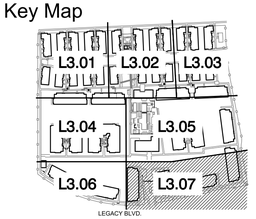
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L3.07

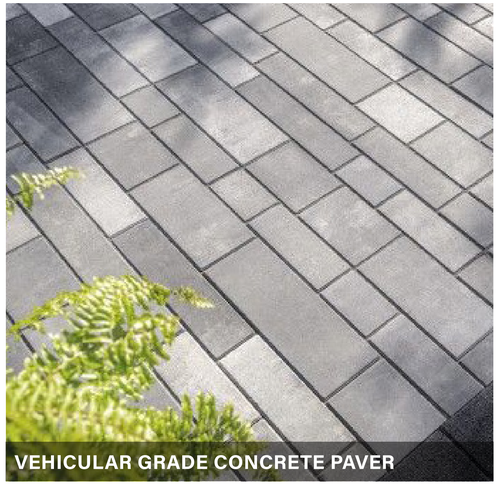
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CONCRETE WALKWAY, NATURAL GRAY


DECOMPOSED GRANITE PAVING


LINEAR CONCRETE PAVERS & STONE PAVING

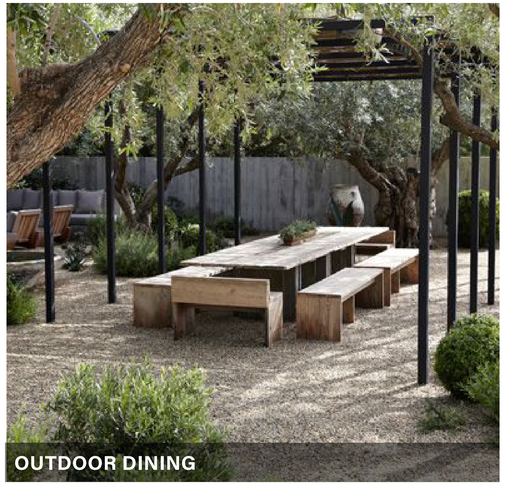

VEHICULAR GRADE CONCRETE PAVER

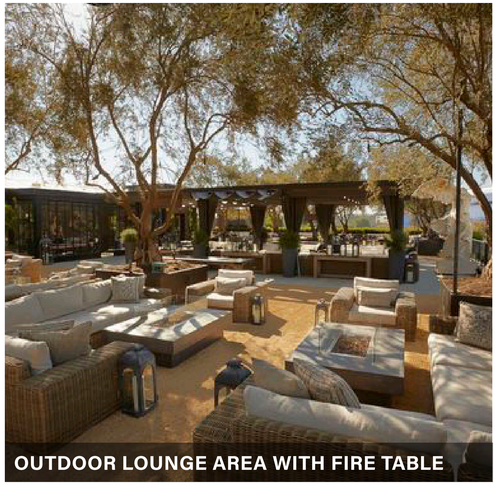

BENCH SEATING AREA

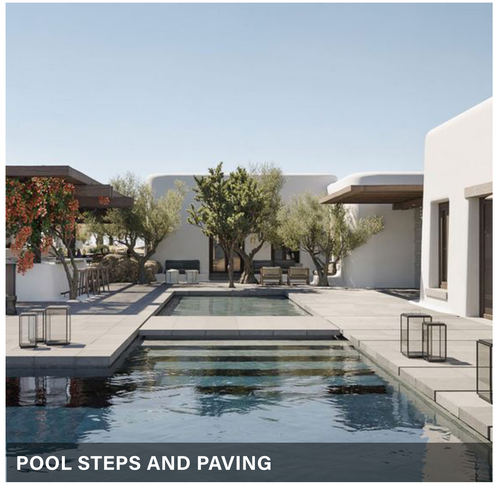

C.I.P. CONCRETE SEAT WALL WITH WOOD TOP

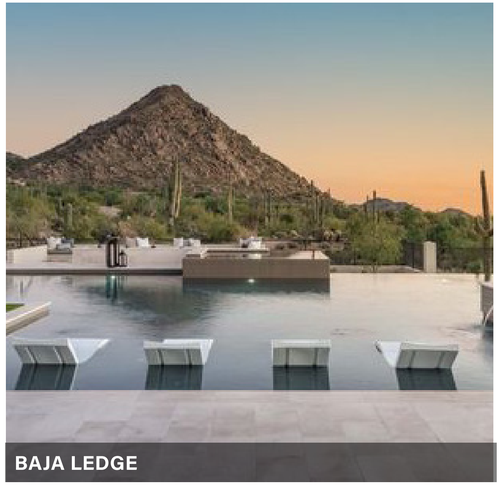

WOOD DECK OVER PLANTING


OVERHEAD STRUCTURE


OUTDOOR DINING


OUTDOOR LOUNGE AREA WITH FIRE TABLE


POOL STEPS AND PAVING


BAJA LEDGE

Legacy North Scottsdale

Scottsdale, AZ

Site Area: 18.57 acres

Client

The Dinerstein Company

1010 S. Coast Highway 101, Ste 106, Encinitas, CA 92024

EPTDESIGN

14988 SAND CANYON AVE, STUDIO 8
IRVINE, CA 92618
949.502.4500
EPTDESIGN.COM

Revisions	By	Date

Job Number	E23-029
Design Staff	EC/JLR
Project Manager	VL
Principal	SC

Site Material Board

L4.01

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Plan Control: DRB Submittal
1st City Sub. June 2023



FIGURE 1: CONTEXT AERIAL PLAN

Kimley»Horn

K:\PHX_Civil\291878000 - Legacy & Miller\CADD\Exhibits\2023-06-14 Context Aerial.dwg Jun 23, 2023 Hunter.Older



OPEN SPACE LEGEND	
SYMBOL	DESCRIPTION
	FRONTAGE OPEN SPACE 104,576 S.F.
	INTERNAL OPEN SPACE 188,149 S.F.
	PARKING AREA 46,847 S.F.
	PARKING LOT LANDSCAPE 37,299 S.F.

OPEN SPACE CALCULATIONS		
	MINIMUM REQUIRED	PROPOSED
TOTAL OPEN SPACE (EXCLUDING PARKING LOT LANDSCAPE)	34% NET LOT AREA 808,909 x .34 = 275,029	275,085 S.F. 34% NET LOT AREA
FRONTAGE OPEN SPACE	50 S.F. / 1 L.F. OF PUBLIC STREET FRONTAGE 50 x 1,877 = 93,850	107,307 S.F. = TOTAL FRONTAGE OPEN SPACE
PARKING LOT LANDSCAPE	15% OF THE PARKING AREA 46,847 x .15 = 7,027	37,299 S.F. 79% OF THE PARKING AREA

0 25 50 100 Feet

Scale: 1" = 50'

Legacy North Scottsdale

Scottsdale, AZ

Site Area: 18.57 acres

Client

The Dinerstein Company

1010 S. Coast Highway 101, Ste 106, Encinitas, CA 92024

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Revisions	By	Date

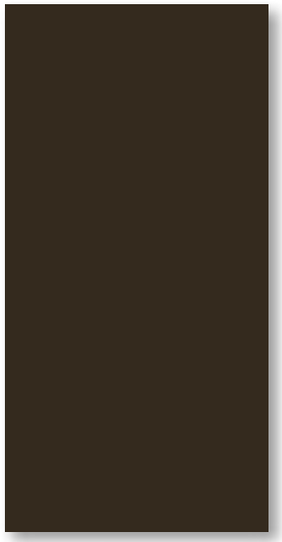
Job Number	E23-029
Design Staff	EC/JLR
Project Manager	VL
Principal	SC

Open Space Plan

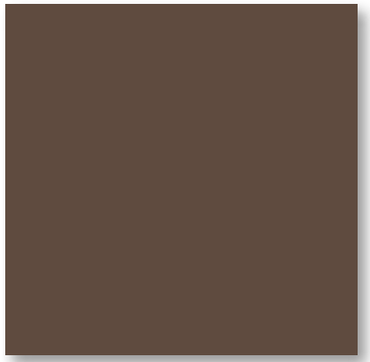
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Plan Control: DRB Submittal
1st City Sub. June 2023

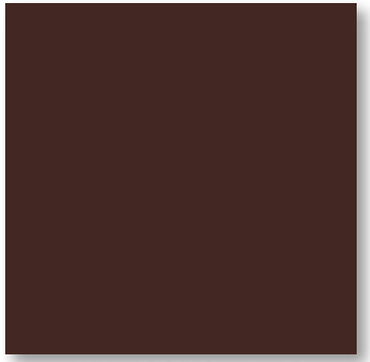
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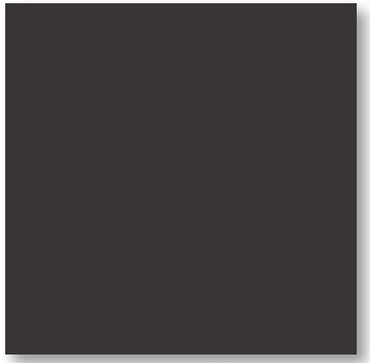
WINDOW FRAMES
BRONZE



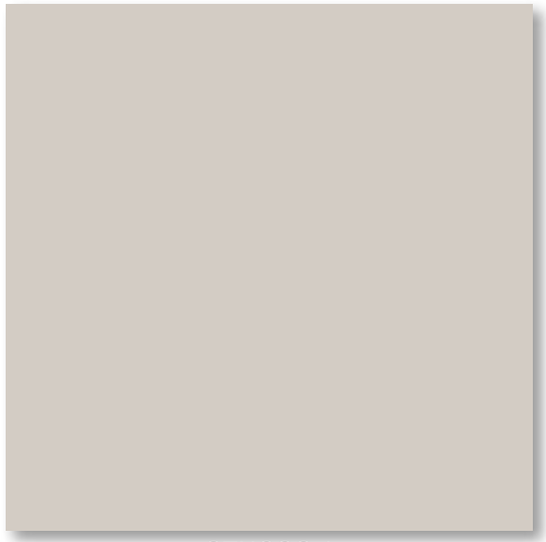
ENTRY/GARAGE DOOR
SW 6083 SABLE



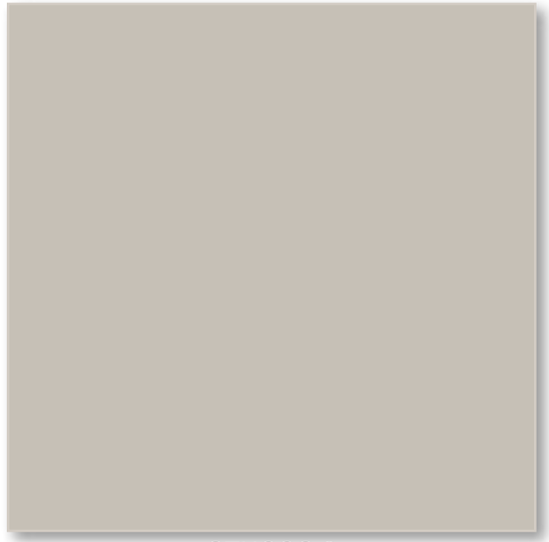
AWNINGS/LOUVERS
SW 2838 POLISHED MAHOGANY



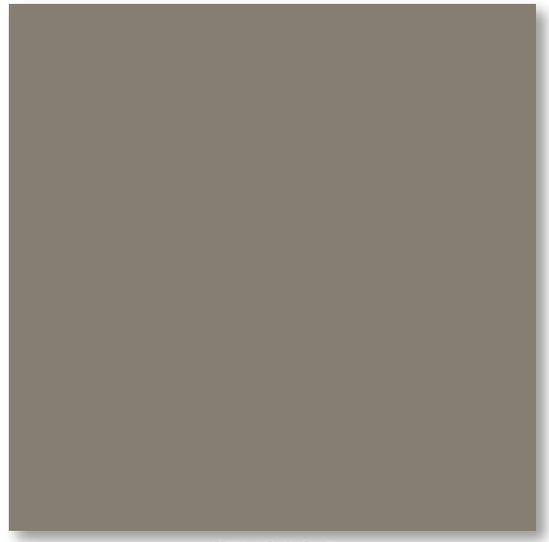
TRIM/FASCIA
SW 9175 DEEP FOREST
BROWN



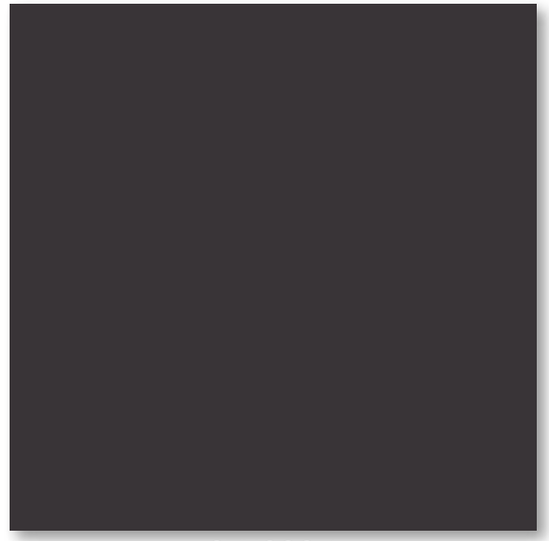
STUCCO 1
SW 7636 ORIGAMI WHITE



STUCCO 2
SW 7634 PEDIMENT



STUCCO 3
SW 7053 ADAPTIVE SHADE



STUCCO 4
SW 9175 DEEP FOREST BROWN



SIDING 1
CERTAINTEED-CEDARBOARDS
INSULATED SIDING - SAVANNAH WICKER

MANUFACTURERS:

PAINT-SHERWIN WILLIAMS

STUCCO-OMEGA

SIDING-CERATINTEED

SIDING-WOODTONE ALLURA

TILE-DALTILE

WINDOWS-MILGUARD

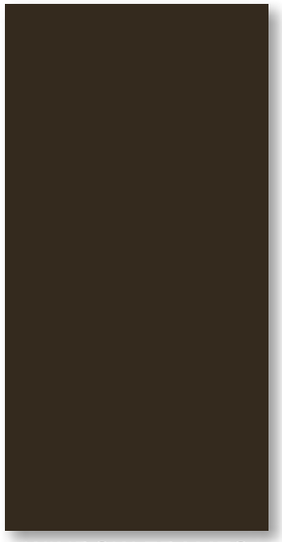
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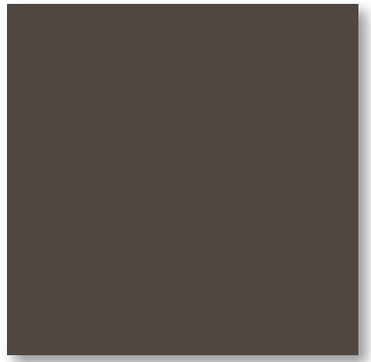
LEGACY NORTH
SCOTTSDALE, AZ # 2023-0044

MATERIAL BOARD

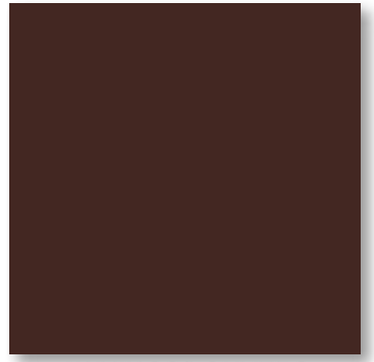
TOWNHOME COLOR SCHEME



WINDOW FRAMES
BRONZE



ACCENT
SW 7020 BLACK FOX



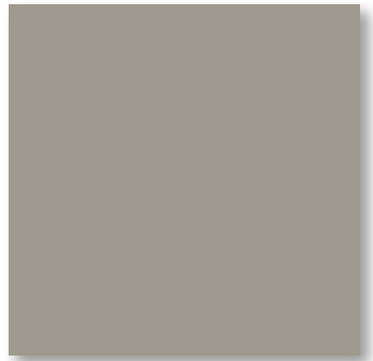
AWNINGS/LOUVERS
SW 2838 POLISHED MAHOGANY



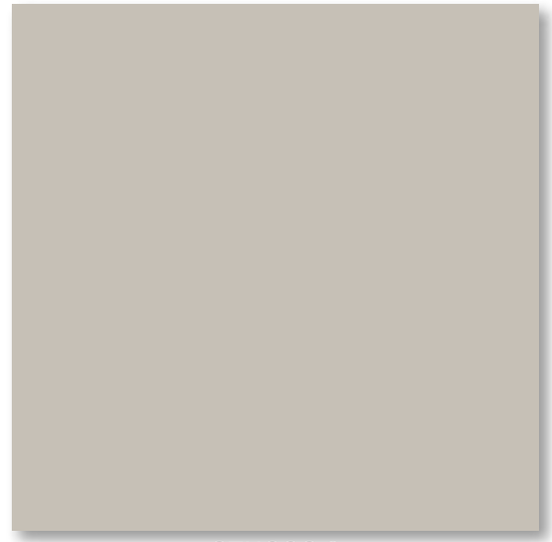
TRIM/FASCIA
SW 9175 DEEP FOREST
BROWN



STUCCO 1
SW 7634 PEDIMENT



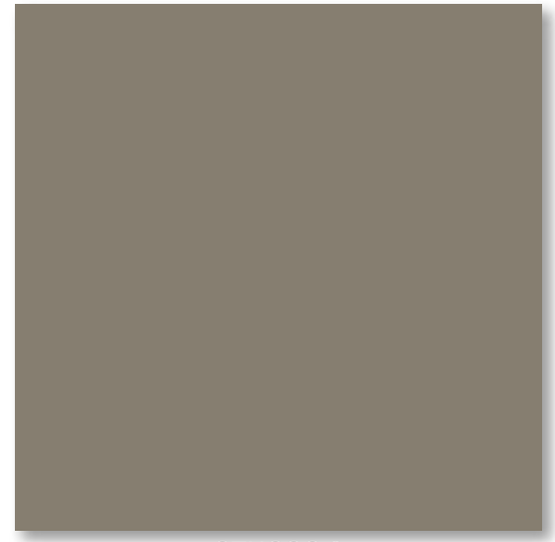
GARAGE DOOR
SW 7642 PAVESTONE



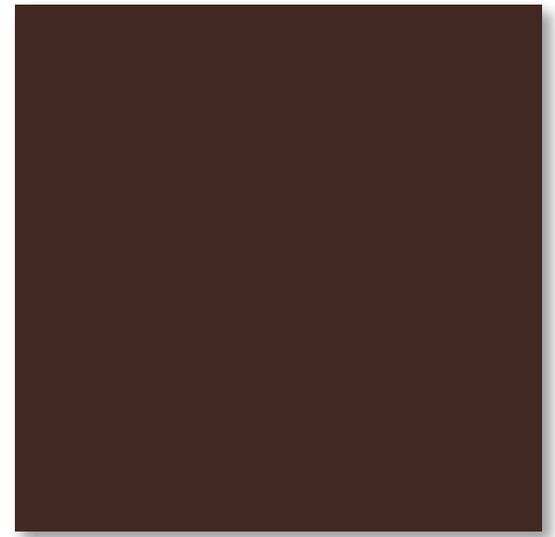
STUCCO 2
SW 7641 COLONNADE GRAY



STONE
ELDORADO - CYPRESS RIDGE - CATANIA



STUCCO 3
SW 7053 ADAPTIVE SHADE



STUCCO 4 - SOFFIT
SW 2838 POLISHED MAHOGANY

MANUFACTURERS:

PAINT-SHERWIN WILLIAMS

STUCCO-OMEGA

SIDING-CERATINTEED

SIDING-WOODTONE ALLURA

TILE-DALTILE

WINDOWS-MILGUARD

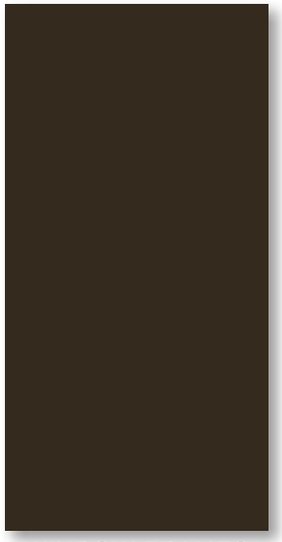
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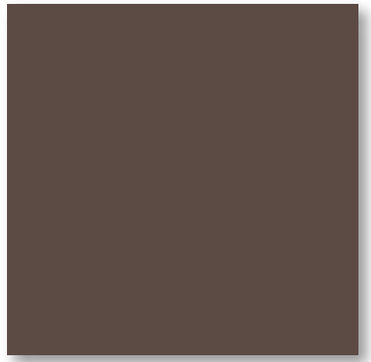
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SCOTTSDALE, AZ # 2023-0044

MATERIAL BOARD

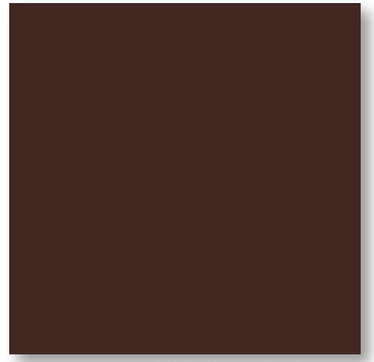
15-PLEX COLOR SCHEME



WINDOW FRAMES
BRONZE



ACCENT
SW 7510 CHATAEU BROWN



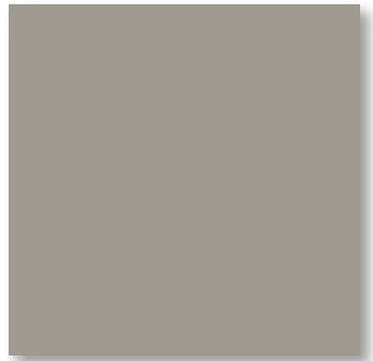
AWNINGS/LOUVERS
SW 2838 POLISHED MAHOGANY



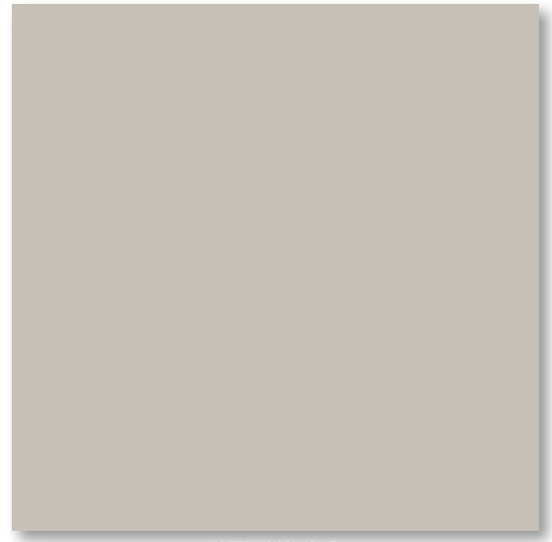
TRIM/FASCIA
SW 9175 DEEP FOREST
BROWN



STUCCO 1
SW 7634 PEDIMENT



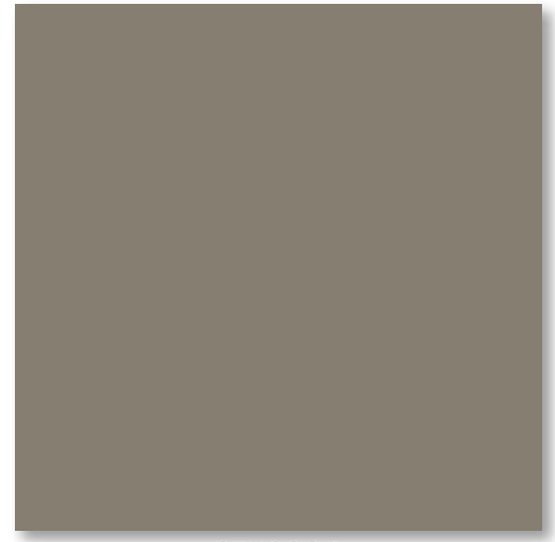
GARAGE DOOR
SW 7642 PAVESTONE



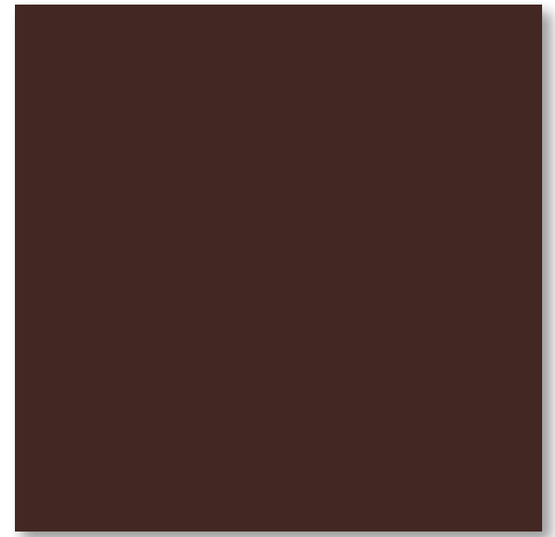
STUCCO 2
SW 7641 COLONNADE GRAY



STONE
ELDORADO - CYPRESS RIDGE - CATANIA



STUCCO 3
SW 7053 ADAPTIVE SHADE



STUCCO 4 - SOFFIT
SW 2838 POLISHED MAHOGANY

MANUFACTURERS:

PAINT-SHERWIN WILLIAMS

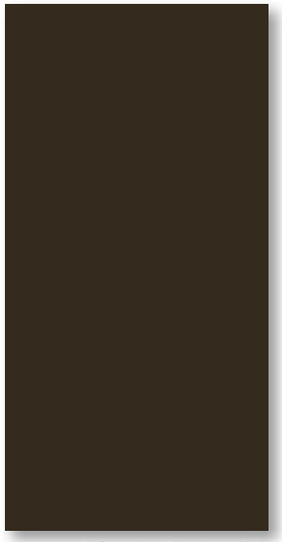
STUCCO-OMEGA

SIDING-CERATINTEED

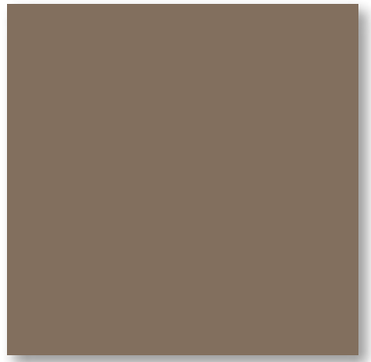
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TILE-DALTILE

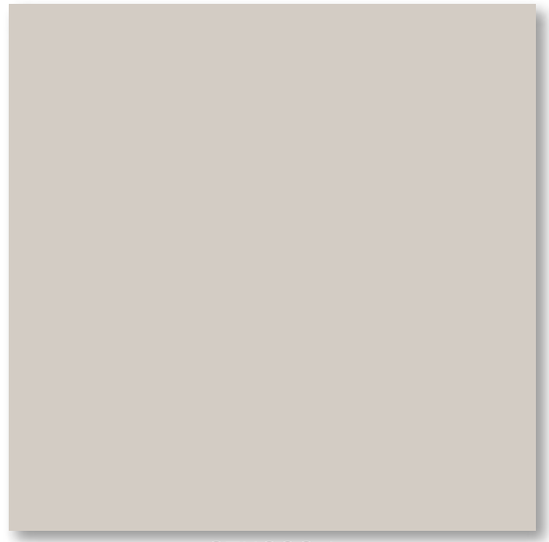
WINDOWS-MILGUARD



WINDOW FRAMES
BRONZE



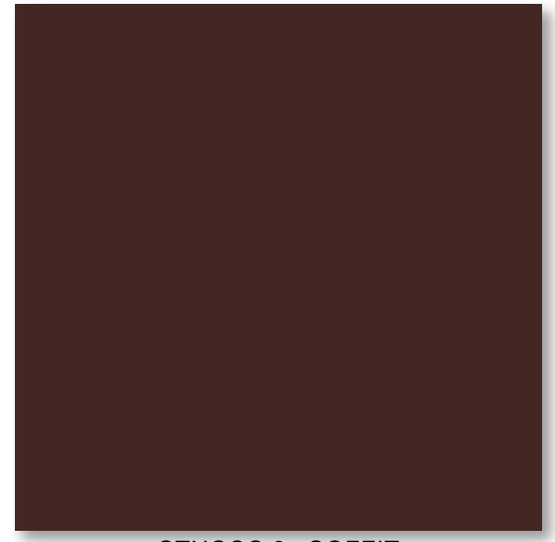
ACCENT
SW 7509 TIKI HUT



STUCCO 1
SW 7634 PEDIMENT



STUCCO 2
SW 0037 MORRIS ROOM GREY



STUCCO 3 - SOFFIT
SW 2838 POLISHED MAHOGANY

MANUFACTURERS:

PAINT-SHERWIN WILLIAMS

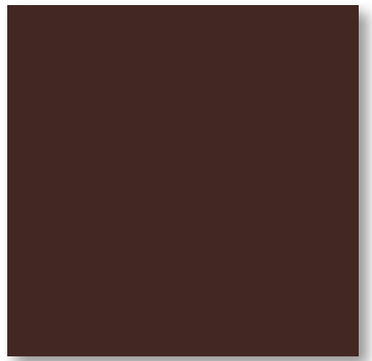
STUCCO-OMEGA

SIDING-CERATINTEED

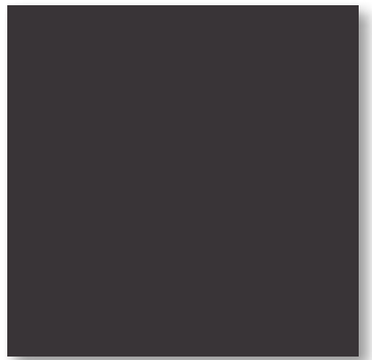
SIDING-WOODTONE ALLURA

TILE-DALTILE

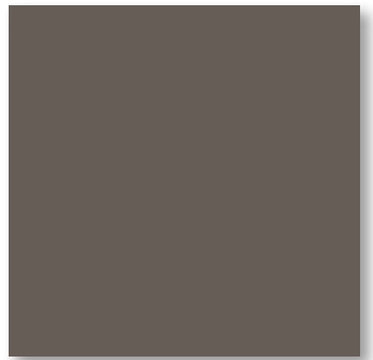
WINDOWS-MILGUARD



AWNINGS/LOUVERS
SW 2838 POLISHED MAHOGANY



TRIM/FASCIA
SW 9175 DEEP FOREST BROWN



GARAGE DOOR
SW 7502 MANOR HOUSE



STONE
ELDORADO - CYPRESS RIDGE - CATANIA

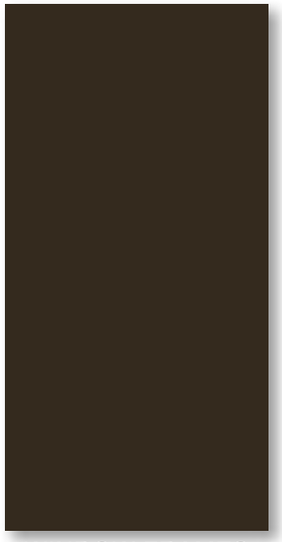
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SCOTTSDALE, AZ # 2023-0044

MATERIAL BOARD

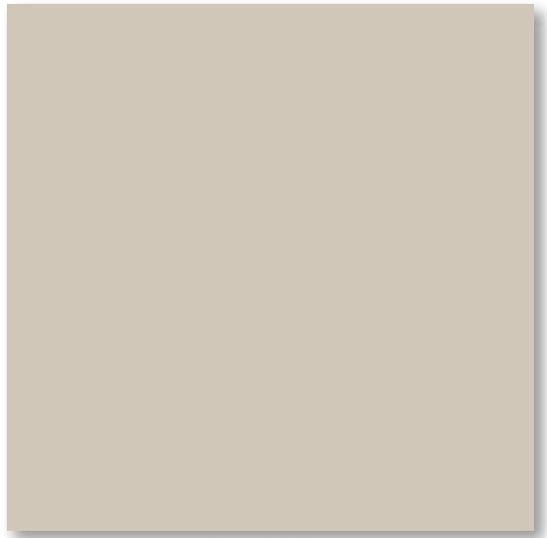
40-PLEX COLOR SCHEME



WINDOW FRAMES
BRONZE



STUCCO 1
SW 7504 KEYSTONE GRAY



STUCCO 2
SW 7036 ACCESSIBLE BEIGE



STUCCO 3
SW 9175 DEEP FOREST BROWN

MANUFACTURERS:

PAINT-SHERWIN WILLIAMS

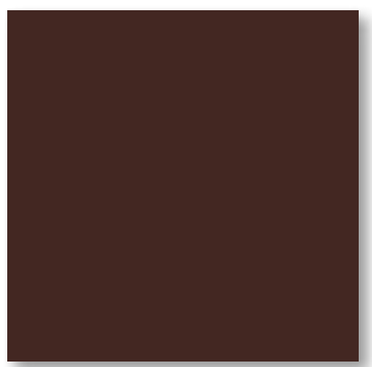
STUCCO-OMEGA

SIDING-CERATINTEEED

SIDING-WOODTONE ALLURA

TILE-DALTILE

WINDOWS-MILGUARD



POST/BEAM/AWNING
SW 2838 POLISHED MAHOGANY



TRIM/FASCIA/UTILITY
SW 9175 DEEP FOREST BROWN



TILE
DALTILE - RENOIR GREY - SQUARE



SIDING - SOFFIT
WOODTONE - ALLURA - MOUNTAIN CEDAR

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SCOTTSDALE, AZ # 2023-0044

MATERIAL BOARD

AMENITY COLOR SCHEME



1 SITE PHOTOMETRICS - PART D
SCALE: 1" = 20'-0"

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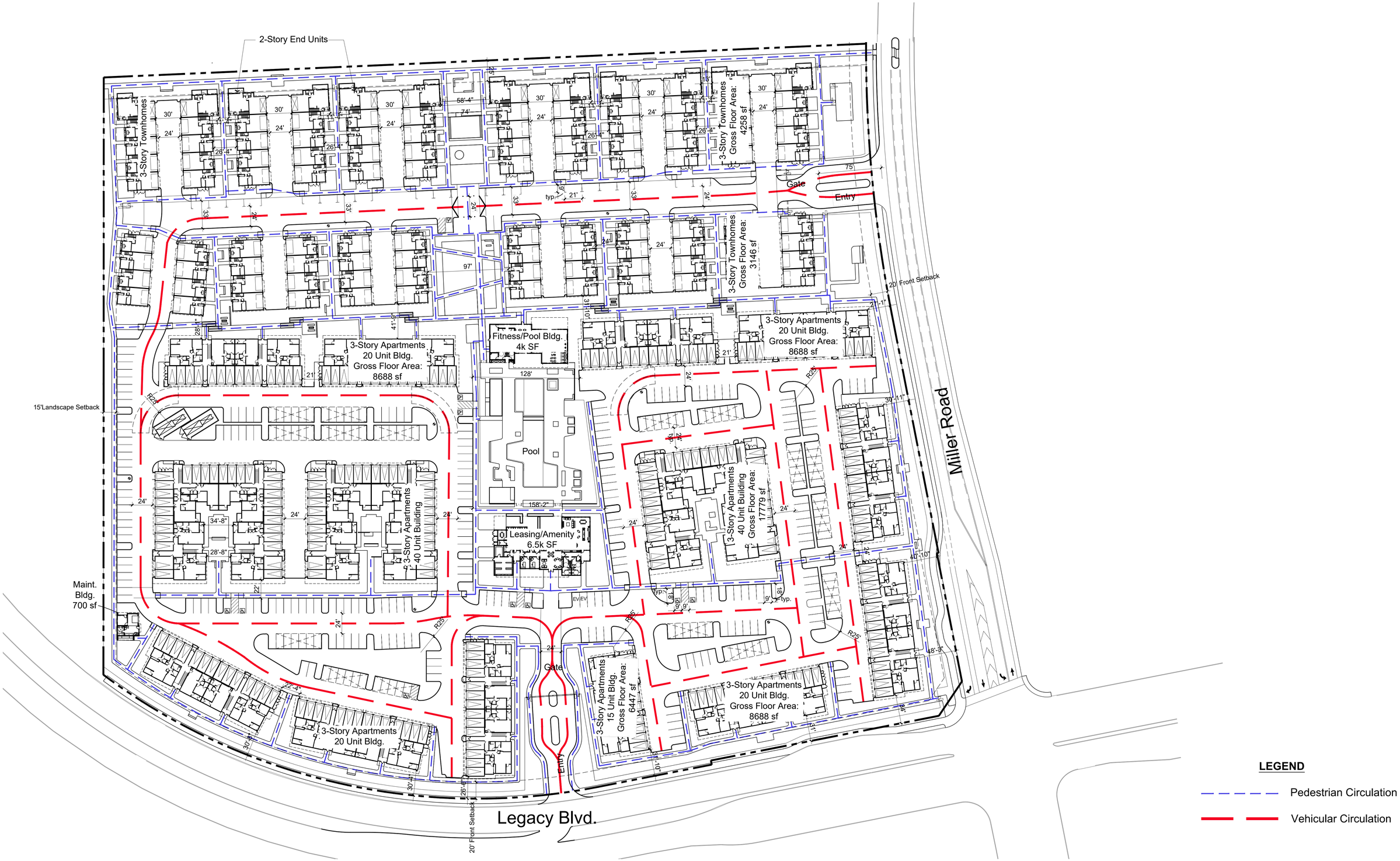
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Encinitas, CA | 92024

LEGACY NORTH
SCOTTSDALE, AZ #2023-0044

CONCEPTUAL DESIGN
June 26, 2023

Jordan & Skala Engineers
10375 Richmond Avenue, Suite 300 • Houston, TX 77042
p. 281.617.3200 • f. 281.617.3207
Texas Registered Engineering Firm F-4990
Project Number: 23060402 Drawn By:XXX Checked By:XXX

Registered Professional Engineer (Electrical)
CERTIFICATE NO.
39728
MARK N.
RIGBIE
12/26/23
DATE SIGNED
ARIZONA U.S.A.
Expires 09/30/2024



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Encinitas, CA | 92024

LEGACY NORTH
SCOTTSDALE, AZ #2023-0044

CONCEPTUAL DESIGN
June 22, 2023

Scale: 1" = 50'-0"
0 25 50 100

CIRCULATION PLAN

A0.1

Master and Final

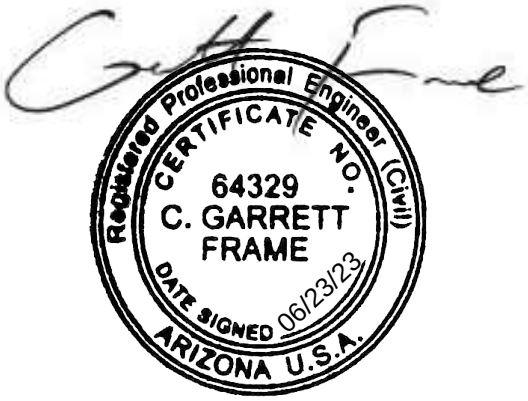
Water Basis of Design Report

Legacy North

NWC of Legacy Boulevard and N. Miller Road

Prepared for:

The Dinerstein Companies
1010 S. Coast Highway 101, Ste 106
Encinitas, CA 92024



Prepared by:

Kimley-Horn & Associates, Inc.
7740 North 16th Street, Suite 300
Phoenix, AZ 85020

Kimley»Horn

291878000
June 2023
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Legacy North

MASTER AND FINAL WATER BASIS OF DESIGN REPORT

JUNE 2023

Prepared By:

Kimley»Horn

Contents

1.0 Introduction 1
2.0 Domestic Water Analysis 2
2.1 Intent and Scope 2
2.2 Domestic Water Supply 2
2.3 International Fire Code 2
2.4 Water Demands 3
2.5 Hydraulic Calculations 4
3.0 Conclusion 4
4.0 References 5

Appendices

Appendix A: Exhibits

Exhibit 1 - Vicinity Map

Exhibit 2 – Utility Layout

Exhibit 3 – WaterCAD Network

Appendix B: Average Day Demand Results

Appendix C: Maximum Day Demand Results

Appendix D: Peak Hour Demand Results

Appendix E: Maximum Day Demand + Fire Flow Results

Appendix F: Fire Hydrant Flow Test Results

Appendix G: Fire Flow Requirements from 2018 IFC

1.0 INTRODUCTION

Kimley-Horn and Associates, Inc. has prepared this Master and Final water basis of design report for the proposed Legacy and Miller development at the northwest corner of Legacy Boulevard and Miller Road in Scottsdale, Arizona. This report intends to demonstrate that the proposed project conforms to the City of Scottsdale design requirements.

The Legacy North Development encompasses approximately 18.52 net acres and contains various multi-family residential buildings totaling 443 dwelling units as well as 11,200 square feet of nonresidential space. The project lies within a portion of the Northwest Quarter of Section 26, Township 4 North, Range 4 East of the Gila and Salt River Base and Meridian in Maricopa County, Arizona. More specifically, the site is bounded on the west by an APS substation, on the south by Legacy Boulevard, on the north by a multi-family complex, and east by undeveloped commercial land. See **Appendix A** for the Vicinity Map.

2.0 DOMESTIC WATER ANALYSIS

2.1 INTENT AND SCOPE

The intent of this section is to evaluate the potable water infrastructure for the proposed development. As a result of this analysis, it will be determined if the potable water infrastructure is capable of satisfying the projected water demands for the proposed development in accordance with the City of Scottsdale Design Standards & Policies Manual (**Reference 1**) and the 2018 International Fire Code (**Reference 2**) for fire prevention.

2.2 DOMESTIC WATER SUPPLY

There is an existing 16-inch DIP water main located in Legacy Boulevard along the south side of the project. There is also an existing 16-inch DIP water main stub located in Miller Road at the southeast corner of the project. Additionally, there is an existing 20" DIP non-potable water main located in Legacy Road along the south of the project. There is also and existing 12" PVC water main in Miller road north of project with a stub at the northeast corner of the project.

The project will extend the public water main within Miller Road along the site frontage and connect the aforementioned water main stubs. The water main in Miller Road to the north and south of the project are in separate pressure zones therefore a pressure reducing valve will be installed along the proposed water main. In order to serve the domestic and fire flow demand for the project, a proposed 8-inch DIP public water main will connect to the proposed 12-inch DIP public water main in Miller Road. This will create a looped water system around the buildings with fire hydrants spaced at a maximum interval of 400-feet.

For domestic water service, each of the buildings will have a water service that connects to the proposed 8-inch DIP water main with a water meter and backflow preventer. Refer to **Exhibit 2** for a utility layout.

2.3 INTERNATIONAL FIRE CODE

According to the City of Scottsdale Fire Department, the 2018 International Fire Code (IFC) with City of Scottsdale Amendments is currently the governing code with respect to fire protection requirements. The IFC evaluates the building construction type, occupancy descriptions, and square footage to set minimum fire flow requirements with regards to a particular development.

The largest proposed building is approximately 52,415 square feet with a V-B construction type. Per Table B105.1(2) of **Reference 2**, the required fire flow is 6,250 gallons per minute. As a fire sprinkler system will be installed in the building, the actual required fire flow is 25% of the fire flow from table B105.1(2) or 1,500 gallons per minute, whichever is greater. Therefore, the minimum required fire flow is 1,562.5 gallons per minute. Fire Flow requirements are provided in **Appendix B** for reference.

A fire flow test was performed by EJ Flow Testing on an existing fire hydrant northeast of the project, along 76th Street. The existing hydrant has an available flow of 5,372 gpm at 20 psi. See **Appendix C** for the fire flow test.

2.4 WATER DEMANDS

According to the guidelines provided in Figure 6-1.2 of **Reference 1**, the proposed development will add the following demands to the existing water system for Average Day Demand (ADD), Maximum Day Demand (MDD), and Peak Hour Demand (PHD):

Average Day Demand:

Residential: 185.3 GPD/unit = 0.27 GPM/unit * (High Density Condominium)

**Per Figure 6-1.2 Average Day Water Demands from the City of Scottsdale Design Standards & Policies Manual the above flow in GPM assumes a 12-hour active water use period per 24-hour day.*

Legacy & Miller (443 units proposed): (0.27 GPM/unit) x (443 units) = 119.61 GPM

Commercial: 0.8 GPD/sq. ft. = 0.00111 GPM/sq. ft. (Leasing and Clubhouse buildings)

**Per Figure 6-1.2 Average Day Water Demands from the City of Scottsdale Design Standards & Policies Manual the above flow in GPM assumes a 12-hour active water use period per 24-hour day.*

Legacy & Miller: (0.00111 GPM/sq. ft.) x (11,200 sq. ft.) = 12.43 GPM

Legacy & Miller Demands:

Average Day Demand = 119.61 GPM + 12.43 GPM = 132.04 GPM

Maximum Day Demand = (2) x (ADD) = 264.08 GPM

Peak Hour Demand = (3.5) x (ADD) = 462.14 GPM

2.5 HYDRAULIC CALCULATIONS

A water model, using Bentley's WaterCAD V8i program, was used to analyze the proposed demands on the water system. Refer to **Exhibit 3** in **Appendix A** for the WaterCAD network used in the model. To determine the existing static and residual water pressure in the area, a fire hydrant flow test was completed using the adjacent fire hydrants near the project. The results from this test produced three different data points for static and residual pressures with associated flow rates. This data was input into the water model and simulated as a reservoir and pump. Refer to **Table 3** below and **Appendix E** for flow test results.

Table 3: Fire Hydrant Flow Test Results

Pressure (PSI)	Flow Rate (GPM)
72	0
58	2,645
20	5,372

The following scenarios were modeled to evaluate the existing and proposed water facilities to demonstrate compliance with the design criteria identified in this report:

- Average Day Demand
- Maximum Day Demand
- Peak Hour Demand
- Maximum Day Demand + Fire Flow

Results from these scenarios can be seen in **Appendices B through E**. For Average Day and the Peak Hour Demand scenarios, all nodes analyzed maintained a minimum pressure of 40 PSI. For the Maximum Day + Fire Flow scenario, all nodes maintained a minimum pressure of 20 PSI while meeting fire flow requirements.

The following **Table 4** describes the minimum design criteria applied during this water analysis.

Table 4: Design Criteria

Design Criteria	Requirement
Minimum Pressure – Maximum Day + Fire Flow	20 psi
Minimum Pressure – Peak Hour, Average Day	40 psi

3.0 CONCLUSION

This development proposes to extend the public water system in Miller Road and connect to the proposed public water system at two points and construct an 8-inch DIP public water main loop to provide sufficient water to the development. The existing and proposed water infrastructure were found to be adequate to support the development.

4.0 REFERENCES

1. City of Scottsdale, *Design Standards and Policies Manual.* 2018.

2. International Code Council, *2018 International Fire* Code. May 201

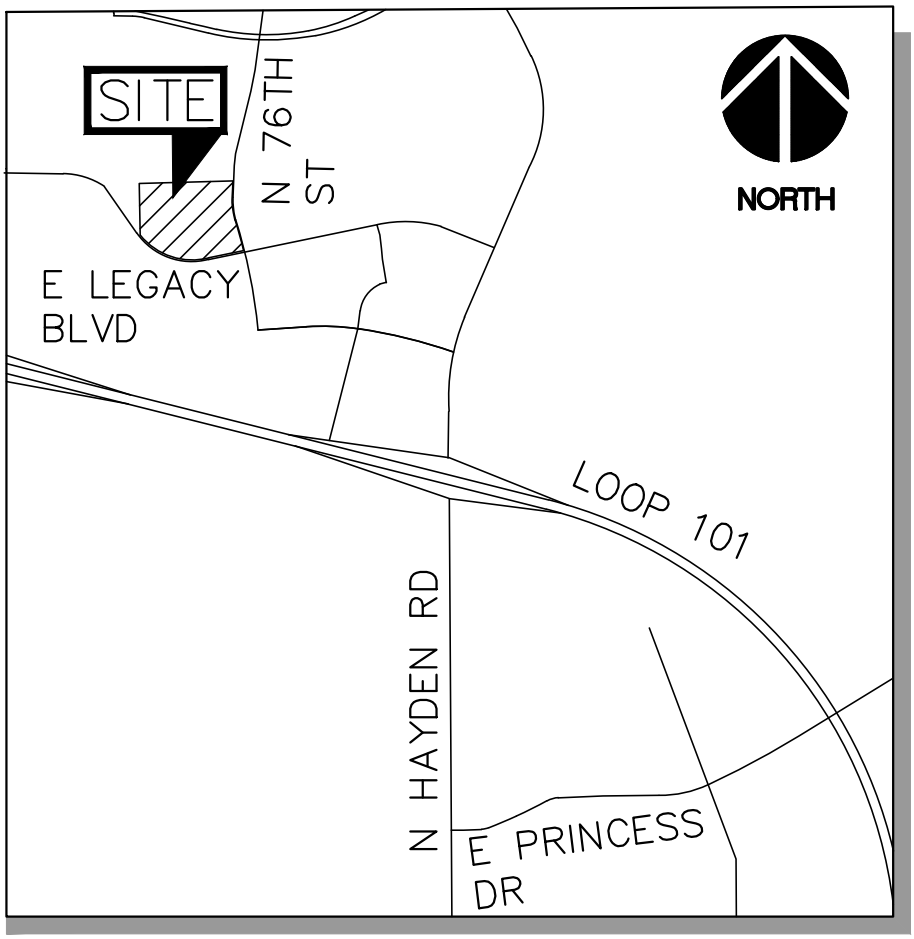
Kimley»Horn

APPENDIX A: Exhibits

Exhibit 1 – Vicinity Map

Exhibit 2 – Utility Layout

Exhibit 3 – WaterCAD Network



VICINITY MAP

SCOTTSDALE, AZ

N.T.S.

VICINITY MAP

N.T.S.

NORTH

Kimley»Horn

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EXHIBIT 2: UTILITY LAYOUT

Kimley»Horn

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WaterCAD Layout



APPENDIX B: Average Day Demand Results

Pipe Table

Junction Table

Hydrant Table

Reservoir Table

Pump Table

Active Scenario: Average Day Demand

FlexTable: Pipe Table

Label	Diameter (in)	Start Node	Stop Node	Length (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/ft)
P-1	12.0	J-1	J-2	157	Ductile Iron	130.0	145.04	0.41	0.01	0.000
P-2	12.0	J-1	J-4	199	Ductile Iron	130.0	-146.54	0.42	0.01	0.000
P-3	6.0	J-4	H-2	37	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-4	8.0	J-2	J-5	136	Ductile Iron	130.0	58.95	0.38	0.01	0.000
P-5	8.0	J-5	J-6	86	Ductile Iron	130.0	56.25	0.36	0.01	0.000
P-6	8.0	J-6	J-7	45	Ductile Iron	130.0	53.55	0.34	0.00	0.000
P-7	8.0	J-7	J-8	86	Ductile Iron	130.0	50.85	0.32	0.01	0.000
P-8	8.0	J-8	J-9	17	Ductile Iron	130.0	48.15	0.31	0.00	0.000
P-9	8.0	J-9	J-10	29	Ductile Iron	130.0	48.15	0.31	0.00	0.000
P-10	8.0	J-10	J-11	86	Ductile Iron	130.0	45.45	0.29	0.01	0.000
P-11	8.0	J-11	J-12	97	Ductile Iron	130.0	42.75	0.27	0.01	0.000
P-12	8.0	J-12	J-13	17	Ductile Iron	130.0	41.25	0.26	0.00	0.000
P-13	8.0	J-13	J-14	69	Ductile Iron	130.0	40.05	0.26	0.00	0.000
P-14	8.0	J-14	J-15	17	Ductile Iron	130.0	38.55	0.25	0.00	0.000
P-15	8.0	J-15	J-16	21	Ductile Iron	130.0	37.35	0.24	0.00	0.000
P-16	8.0	J-16	J-17	10	Ductile Iron	130.0	37.35	0.24	0.00	0.000
P-17	8.0	J-17	J-18	14	Ductile Iron	130.0	35.85	0.23	0.00	0.000
P-18	8.0	J-18	J-19	85	Ductile Iron	130.0	34.65	0.22	0.00	0.000
P-19	8.0	J-19	J-20	11	Ductile Iron	130.0	33.45	0.21	0.00	0.000
P-20	8.0	J-20	J-21	23	Ductile Iron	130.0	31.95	0.20	0.00	0.000
P-21	8.0	J-21	J-22	10	Ductile Iron	130.0	30.45	0.19	0.00	0.000
P-22	8.0	J-22	J-23	39	Ductile Iron	130.0	29.25	0.19	0.00	0.000
P-23	6.0	J-5	BLDG X	25	Ductile Iron	130.0	1.20	0.01	0.00	0.000
P-24	6.0	J-5	BLDG L	26	Ductile Iron	130.0	1.50	0.02	0.00	0.000
P-25	8.0	J-23	J-24	9	Ductile Iron	130.0	27.75	0.18	0.00	0.000
P-26	8.0	J-24	J-25	206	Ductile Iron	130.0	26.55	0.17	0.00	0.000
P-27	8.0	J-25	J-26	83	Ductile Iron	130.0	8.56	0.05	0.00	0.000
P-28	8.0	J-26	J-27	16	Ductile Iron	130.0	-3.34	0.02	0.00	0.000
P-29	8.0	J-27	J-48	166	Ductile Iron	130.0	-3.34	0.02	0.00	0.000
P-30	8.0	J-28	J-29	154	Ductile Iron	130.0	-10.12	0.06	0.00	0.000
P-31	8.0	J-29	J-30	41	Ductile Iron	130.0	-10.12	0.06	0.00	0.000
P-32	8.0	J-30	J-31	26	Ductile Iron	130.0	-33.69	0.22	0.00	0.000
P-33	8.0	J-31	J-32	178	Ductile Iron	130.0	-39.69	0.25	0.01	0.000
P-34	6.0	J-32	BLDG F1	45	Ductile Iron	130.0	4.50	0.05	0.00	0.000
P-35	8.0	J-32	J-33	29	Ductile Iron	130.0	-44.19	0.28	0.00	0.000
P-36	8.0	J-33	J-34	150	Ductile Iron	130.0	-22.92	0.15	0.00	0.000
P-37	8.0	J-35	J-36	143	Ductile Iron	130.0	-28.92	0.18	0.00	0.000
P-38	8.0	J-36	J-37	192	Ductile Iron	130.0	-34.92	0.22	0.01	0.000
P-39	8.0	J-37	J-38	39	Ductile Iron	130.0	-40.92	0.26	0.00	0.000
P-40	8.0	J-38	J-3	136	Ductile Iron	130.0	-86.09	0.55	0.03	0.000
P-41	12.0	PMP-3	J-4	28	Ductile Iron	130.0	146.54	0.42	0.00	0.000
P-42	12.0	R-1	PMP-3	24	Ductile Iron	130.0	146.54	0.42	0.00	0.000
P-43	6.0	J-47	BLDG A1	6	Ductile Iron	130.0	6.00	0.07	0.00	0.000
P-44	6.0	J-47	BLDG B1	9	Ductile Iron	130.0	6.00	0.07	0.00	0.000
P-45	6.0	J-44	J-47	24	Ductile Iron	130.0	12.00	0.14	0.00	0.000
P-46	8.0	J-34	J-35	117	Ductile Iron	130.0	-22.92	0.15	0.00	0.000
P-47	6.0	J-40	BLDG K1	84	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-48	6.0	J-40	BLDG Z	24	Ductile Iron	130.0	6.00	0.07	0.00	0.000

Active Scenario: Average Day Demand

FlexTable: Pipe Table

Label	Diameter (in)	Start Node	Stop Node	Length (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/ft)
P-49	6.0	J-24	BLDG M	44	Ductile Iron	130.0	1.20	0.01	0.00	0.000
P-50	6.0	J-36	BLDG H1	24	Ductile Iron	130.0	6.00	0.07	0.00	0.000
P-51	6.0	J-35	BLDG G1	31	Ductile Iron	130.0	6.00	0.07	0.00	0.000
P-52	6.0	J-37	BLDG I1	23	Ductile Iron	130.0	6.00	0.07	0.00	0.000
P-53	6.0	J-43	BLDG M1	51	Ductile Iron	130.0	7.22	0.08	0.00	0.000
P-54	6.0	J-27	H-6	17	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-55	6.0	J-26	BLDG J1	23	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-56	6.0	J-39	BLDG Y	23	Ductile Iron	130.0	6.00	0.07	0.00	0.000
P-57	6.0	J-23	BLDG A	64	Ductile Iron	130.0	1.50	0.02	0.00	0.000
P-58	6.0	J-21	BLDG B	28	Ductile Iron	130.0	1.50	0.02	0.00	0.000
P-59	8.0	J-25	J-39	21	Ductile Iron	130.0	17.99	0.11	0.00	0.000
P-60	8.0	J-39	J-40	185	Ductile Iron	130.0	11.99	0.08	0.00	0.000
P-61	8.0	J-40	J-41	160	Ductile Iron	130.0	-5.91	0.04	0.00	0.000
P-62	8.0	J-41	J-42	35	Ductile Iron	130.0	-10.35	0.07	0.00	0.000
P-63	8.0	J-42	J-43	144	Ductile Iron	130.0	-10.35	0.07	0.00	0.000
P-64	8.0	J-43	J-30	92	Ductile Iron	130.0	-17.57	0.11	0.00	0.000
P-65	6.0	J-31	BLDG E1	22	Ductile Iron	130.0	6.00	0.07	0.00	0.000
P-66	6.0	J-30	BLDG D1	138	Ductile Iron	130.0	6.00	0.07	0.00	0.000
P-68	6.0	J-6	BLDG K	29	Ductile Iron	130.0	1.50	0.02	0.00	0.000
P-69	6.0	J-6	BLDG W	21	Ductile Iron	130.0	1.20	0.01	0.00	0.000
P-70	6.0	J-7	BLDG V	22	Ductile Iron	130.0	1.20	0.01	0.00	0.000
P-71	6.0	J-7	BLDG J	28	Ductile Iron	130.0	1.50	0.02	0.00	0.000
P-72	6.0	J-8	BLDG U	22	Ductile Iron	130.0	1.20	0.01	0.00	0.000
P-73	6.0	J-8	BLDG I	29	Ductile Iron	130.0	1.50	0.02	0.00	0.000
P-74	8.0	J-38	J-44	118	Ductile Iron	130.0	45.17	0.29	0.01	0.000
P-75	8.0	J-44	J-45	101	Ductile Iron	130.0	33.17	0.21	0.00	0.000
P-76	8.0	J-45	J-46	119	Ductile Iron	130.0	33.17	0.21	0.00	0.000
P-77	8.0	J-46	J-33	193	Ductile Iron	130.0	21.27	0.14	0.00	0.000
P-78	6.0	J-9	H-3	17	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-79	6.0	J-11	BLDG S	21	Ductile Iron	130.0	1.20	0.01	0.00	0.000
P-80	6.0	J-11	BLDG G	30	Ductile Iron	130.0	1.50	0.02	0.00	0.000
P-81	6.0	J-12	BLDG F	28	Ductile Iron	130.0	1.50	0.02	0.00	0.000
P-82	6.0	J-14	BLDG E	28	Ductile Iron	130.0	1.50	0.02	0.00	0.000
P-83	12.0	J-2	J-3	213	Ductile Iron	130.0	86.09	0.24	0.01	0.000
P-85	6.0	J-16	H-4	17	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-86	6.0	J-42	H-5	18	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-87	6.0	J-29	H-7	15	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-88	6.0	J-34	H-8	18	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-89	6.0	J-45	H-9	19	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-90	6.0	J-41	BLDG N1	113	Ductile Iron	130.0	4.44	0.05	0.00	0.000
P-91	6.0	J-46	BLDG L1	31	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-92	6.0	J-28	BLDG C1	106	Ductile Iron	130.0	6.00	0.07	0.00	0.000
P-95	6.0	J-10	BLDG T	21	Ductile Iron	130.0	1.20	0.01	0.00	0.000
P-96	6.0	J-10	BLDG H	29	Ductile Iron	130.0	1.50	0.02	0.00	0.000
P-97	6.0	J-13	BLDG R	21	Ductile Iron	130.0	1.20	0.01	0.00	0.000
P-98	6.0	J-15	BLDG Q	21	Ductile Iron	130.0	1.20	0.01	0.00	0.000
P-99	6.0	J-17	BLDG D	28	Ductile Iron	130.0	1.50	0.02	0.00	0.000

Active Scenario: Average Day Demand

FlexTable: Pipe Table

Label	Diameter (in)	Start Node	Stop Node	Length (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/ft)
P-100	6.0	J-18	BLDG P	21	Ductile Iron	130.0	1.20	0.01	0.00	0.000
P-101	6.0	J-19	BLDG O	21	Ductile Iron	130.0	1.20	0.01	0.00	0.000
P-102	6.0	J-20	BLDG C	55	Ductile Iron	130.0	1.50	0.02	0.00	0.000
P-103	6.0	J-22	BLDG N	24	Ductile Iron	130.0	1.20	0.01	0.00	0.000
P-104	8.0	J-48	J-28	160	Ductile Iron	130.0	-4.12	0.03	0.00	0.000
P-105	6.0	BLDG O1	J-48	28	Ductile Iron	130.0	-0.78	0.01	0.00	0.000

Active Scenario: Average Day Demand

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
BLDG A	43.00	1.50	213.35	74
BLDG A1	41.50	6.00	213.37	74
BLDG B	43.00	1.50	213.35	74
BLDG B1	42.00	6.00	213.37	74
BLDG C	43.50	1.50	213.35	73
BLDG C1	33.50	6.00	213.35	78
BLDG D	43.50	1.50	213.36	73
BLDG D1	33.00	6.00	213.35	78
BLDG E	44.00	1.50	213.36	73
BLDG E1	33.50	6.00	213.35	78
BLDG F	44.00	1.50	213.36	73
BLDG F1	35.50	4.50	213.36	77
BLDG G	45.50	1.50	213.37	73
BLDG G1	37.00	6.00	213.36	76
BLDG H	45.50	1.50	213.37	73
BLDG H1	38.50	6.00	213.37	76
BLDG I	45.50	1.50	213.38	73
BLDG I1	40.00	6.00	213.37	75
BLDG J	45.50	1.50	213.38	73
BLDG J1	37.00	11.90	213.35	76
BLDG K	46.00	1.50	213.39	72
BLDG K1	37.00	11.90	213.34	76
BLDG L	46.00	1.50	213.40	72
BLDG L1	40.00	11.90	213.36	75
BLDG M	40.50	1.20	213.35	75
BLDG M1	38.00	7.22	213.35	76
BLDG N	40.50	1.20	213.35	75
BLDG N1	41.50	4.44	213.35	74
BLDG O	41.50	1.20	213.35	74
BLDG O1	34.50	0.78	213.35	77
BLDG P	41.50	1.20	213.36	74
BLDG Q	42.00	1.20	213.36	74
BLDG R	42.00	1.20	213.36	74
BLDG S	43.50	1.20	213.37	73
BLDG T	43.50	1.20	213.37	73
BLDG U	44.00	1.20	213.38	73
BLDG V	44.00	1.20	213.38	73
BLDG W	44.50	1.20	213.39	73
BLDG X	44.50	1.20	213.40	73
BLDG Y	39.00	6.00	213.35	75
BLDG Z	39.50	6.00	213.35	75
J-1	47.47	1.50	213.42	72
J-2	45.87	0.00	213.41	72
J-3	42.72	0.00	213.40	74
J-4	47.47	0.00	213.43	72
J-5	44.24	0.00	213.40	73
J-6	44.52	0.00	213.39	73
J-7	44.34	0.00	213.38	73

Active Scenario: Average Day Demand

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-8	44.05	0.00	213.38	73
J-9	44.00	0.00	213.38	73
J-10	43.93	0.00	213.37	73
J-11	43.54	0.00	213.37	73
J-12	42.74	0.00	213.36	74
J-13	42.60	0.00	213.36	74
J-14	42.24	0.00	213.36	74
J-15	42.17	0.00	213.36	74
J-16	42.09	0.00	213.36	74
J-17	42.06	0.00	213.36	74
J-18	42.00	0.00	213.36	74
J-19	41.63	0.00	213.35	74
J-20	41.52	0.00	213.35	74
J-21	41.28	0.00	213.35	74
J-22	41.18	0.00	213.35	74
J-23	41.23	0.00	213.35	74
J-24	40.90	0.00	213.35	75
J-25	37.88	0.00	213.35	76
J-26	36.56	0.00	213.35	76
J-27	36.73	0.00	213.35	76
J-28	33.99	0.00	213.35	78
J-29	35.01	0.00	213.35	77
J-30	34.70	0.00	213.35	77
J-31	34.92	0.00	213.35	77
J-32	37.19	0.00	213.36	76
J-33	37.41	0.00	213.36	76
J-34	37.94	0.00	213.36	76
J-35	36.94	0.00	213.36	76
J-36	38.73	0.00	213.37	76
J-37	40.25	0.00	213.37	75
J-38	41.72	0.00	213.38	74
J-39	38.40	0.00	213.35	76
J-40	38.81	0.00	213.35	76
J-41	38.98	0.00	213.35	75
J-42	37.36	0.00	213.35	76
J-43	36.47	0.00	213.35	77
J-44	41.46	0.00	213.37	74
J-45	41.25	0.00	213.37	74
J-46	39.49	0.00	213.36	75
J-47	41.68	0.00	213.37	74
J-48	35.33	0.00	213.35	77

Active Scenario: Average Day Demand

Hydrant Table - Time: 0.00 hours

Label	Elevation (ft)	Length (Hydrant Lateral) (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-2	47.47	20	0.00	213.43	72
H-3	43.59	20	0.00	213.38	73
H-4	41.58	20	0.00	213.36	74
H-5	37.02	20	0.00	213.35	76
H-6	36.34	20	0.00	213.35	77
H-7	35.71	20	0.00	213.35	77
H-8	37.51	20	0.00	213.36	76
H-9	40.89	20	0.00	213.37	75

Reservoir Table - Time: 0.00 hours

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	47.47	146.54	47.47

Pump Table - Time: 0.00 hours

Label	Elevation (ft)	Pump Definition	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-3	47.47	Flow Test	47.47	213.44	146.54	165.97

Kimley»Horn

APPENDIX C: Maximum Day Demand Results

Pipe Table

Junction Table

Hydrant Table

Reservoir Table

Pump Table

Active Scenario: Maximum Day Demand

FlexTable: Pipe Table

Label	Diameter (in)	Start Node	Stop Node	Length (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/ft)
P-1	12.0	J-1	J-2	157	Ductile Iron	130.0	278.53	0.79	0.04	0.000
P-2	12.0	J-1	J-4	199	Ductile Iron	130.0	-278.53	0.79	0.05	0.000
P-3	6.0	J-4	H-2	37	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-4	8.0	J-2	J-5	136	Ductile Iron	130.0	113.34	0.72	0.04	0.000
P-5	8.0	J-5	J-6	86	Ductile Iron	130.0	107.94	0.69	0.03	0.000
P-6	8.0	J-6	J-7	45	Ductile Iron	130.0	102.54	0.65	0.01	0.000
P-7	8.0	J-7	J-8	86	Ductile Iron	130.0	97.14	0.62	0.02	0.000
P-8	8.0	J-8	J-9	17	Ductile Iron	130.0	91.74	0.59	0.00	0.000
P-9	8.0	J-9	J-10	29	Ductile Iron	130.0	91.74	0.59	0.01	0.000
P-10	8.0	J-10	J-11	86	Ductile Iron	130.0	86.34	0.55	0.02	0.000
P-11	8.0	J-11	J-12	97	Ductile Iron	130.0	80.94	0.52	0.02	0.000
P-12	8.0	J-12	J-13	17	Ductile Iron	130.0	77.94	0.50	0.00	0.000
P-13	8.0	J-13	J-14	69	Ductile Iron	130.0	75.54	0.48	0.01	0.000
P-14	8.0	J-14	J-15	17	Ductile Iron	130.0	72.54	0.46	0.00	0.000
P-15	8.0	J-15	J-16	21	Ductile Iron	130.0	70.14	0.45	0.00	0.000
P-16	8.0	J-16	J-17	10	Ductile Iron	130.0	70.14	0.45	0.00	0.000
P-17	8.0	J-17	J-18	14	Ductile Iron	130.0	67.14	0.43	0.00	0.000
P-18	8.0	J-18	J-19	85	Ductile Iron	130.0	64.74	0.41	0.01	0.000
P-19	8.0	J-19	J-20	11	Ductile Iron	130.0	62.34	0.40	0.00	0.000
P-20	8.0	J-20	J-21	23	Ductile Iron	130.0	59.34	0.38	0.00	0.000
P-21	8.0	J-21	J-22	10	Ductile Iron	130.0	56.34	0.36	0.00	0.000
P-22	8.0	J-22	J-23	39	Ductile Iron	130.0	53.94	0.34	0.00	0.000
P-23	6.0	J-5	BLDG X	25	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-24	6.0	J-5	BLDG L	26	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-25	8.0	J-23	J-24	9	Ductile Iron	130.0	50.94	0.33	0.00	0.000
P-26	8.0	J-24	J-25	206	Ductile Iron	130.0	48.54	0.31	0.01	0.000
P-27	8.0	J-25	J-26	83	Ductile Iron	130.0	16.55	0.11	0.00	0.000
P-28	8.0	J-26	J-27	16	Ductile Iron	130.0	-7.25	0.05	0.00	0.000
P-29	8.0	J-27	J-48	166	Ductile Iron	130.0	-7.25	0.05	0.00	0.000
P-30	8.0	J-28	J-29	154	Ductile Iron	130.0	-19.15	0.12	0.00	0.000
P-31	8.0	J-29	J-30	41	Ductile Iron	130.0	-19.15	0.12	0.00	0.000
P-32	8.0	J-30	J-31	26	Ductile Iron	130.0	-61.09	0.39	0.00	0.000
P-33	8.0	J-31	J-32	178	Ductile Iron	130.0	-72.99	0.47	0.03	0.000
P-34	6.0	J-32	BLDG F1	45	Ductile Iron	130.0	8.90	0.10	0.00	0.000
P-35	8.0	J-32	J-33	29	Ductile Iron	130.0	-81.89	0.52	0.01	0.000
P-36	8.0	J-33	J-34	150	Ductile Iron	130.0	-42.81	0.27	0.01	0.000
P-37	8.0	J-35	J-36	143	Ductile Iron	130.0	-54.72	0.35	0.01	0.000
P-38	8.0	J-36	J-37	192	Ductile Iron	130.0	-66.62	0.43	0.02	0.000
P-39	8.0	J-37	J-38	39	Ductile Iron	130.0	-78.52	0.50	0.01	0.000
P-40	8.0	J-38	J-3	136	Ductile Iron	130.0	-165.19	1.05	0.09	0.001
P-41	12.0	PMP-3	J-4	28	Ductile Iron	130.0	278.53	0.79	0.01	0.000
P-42	12.0	R-1	PMP-3	24	Ductile Iron	130.0	278.53	0.79	0.01	0.000
P-43	6.0	J-47	BLDG A1	6	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-44	6.0	J-47	BLDG B1	9	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-45	6.0	J-44	J-47	24	Ductile Iron	130.0	23.80	0.27	0.00	0.000
P-46	8.0	J-34	J-35	117	Ductile Iron	130.0	-42.82	0.27	0.01	0.000
P-47	6.0	J-40	BLDG K1	84	Ductile Iron	130.0	23.80	0.27	0.01	0.000
P-48	6.0	J-40	BLDG Z	24	Ductile Iron	130.0	11.90	0.14	0.00	0.000

Active Scenario: Maximum Day Demand

FlexTable: Pipe Table

Label	Diameter (in)	Start Node	Stop Node	Length (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/ft)
P-49	6.0	J-24	BLDG M	44	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-50	6.0	J-36	BLDG H1	24	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-51	6.0	J-35	BLDG G1	31	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-52	6.0	J-37	BLDG I1	23	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-53	6.0	J-43	BLDG M1	51	Ductile Iron	130.0	14.43	0.16	0.00	0.000
P-54	6.0	J-27	H-6	17	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-55	6.0	J-26	BLDG J1	23	Ductile Iron	130.0	23.80	0.27	0.00	0.000
P-56	6.0	J-39	BLDG Y	23	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-57	6.0	J-23	BLDG A	64	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-58	6.0	J-21	BLDG B	28	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-59	8.0	J-25	J-39	21	Ductile Iron	130.0	31.99	0.20	0.00	0.000
P-60	8.0	J-39	J-40	185	Ductile Iron	130.0	20.09	0.13	0.00	0.000
P-61	8.0	J-40	J-41	160	Ductile Iron	130.0	-15.61	0.10	0.00	0.000
P-62	8.0	J-41	J-42	35	Ductile Iron	130.0	-15.61	0.10	0.00	0.000
P-63	8.0	J-42	J-43	144	Ductile Iron	130.0	-15.62	0.10	0.00	0.000
P-64	8.0	J-43	J-30	92	Ductile Iron	130.0	-30.05	0.19	0.00	0.000
P-65	6.0	J-31	BLDG E1	22	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-66	6.0	J-30	BLDG D1	138	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-68	6.0	J-6	BLDG K	29	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-69	6.0	J-6	BLDG W	21	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-70	6.0	J-7	BLDG V	22	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-71	6.0	J-7	BLDG J	28	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-72	6.0	J-8	BLDG U	22	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-73	6.0	J-8	BLDG I	29	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-74	8.0	J-38	J-44	118	Ductile Iron	130.0	86.68	0.55	0.02	0.000
P-75	8.0	J-44	J-45	101	Ductile Iron	130.0	62.88	0.40	0.01	0.000
P-76	8.0	J-45	J-46	119	Ductile Iron	130.0	62.88	0.40	0.01	0.000
P-77	8.0	J-46	J-33	193	Ductile Iron	130.0	39.08	0.25	0.01	0.000
P-78	6.0	J-9	H-3	17	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-79	6.0	J-11	BLDG S	21	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-80	6.0	J-11	BLDG G	30	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-81	6.0	J-12	BLDG F	28	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-82	6.0	J-14	BLDG E	28	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-83	12.0	J-2	J-3	213	Ductile Iron	130.0	165.19	0.47	0.02	0.000
P-85	6.0	J-16	H-4	17	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-86	6.0	J-42	H-5	18	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-87	6.0	J-29	H-7	15	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-88	6.0	J-34	H-8	18	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-89	6.0	J-45	H-9	19	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-90	6.0	J-41	BLDG N1	113	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-91	6.0	J-46	BLDG L1	31	Ductile Iron	130.0	23.80	0.27	0.00	0.000
P-92	6.0	J-28	BLDG C1	106	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-95	6.0	J-10	BLDG T	21	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-96	6.0	J-10	BLDG H	29	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-97	6.0	J-13	BLDG R	21	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-98	6.0	J-15	BLDG Q	21	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-99	6.0	J-17	BLDG D	28	Ductile Iron	130.0	3.00	0.03	0.00	0.000

Active Scenario: Maximum Day Demand

FlexTable: Pipe Table

Label	Diameter (in)	Start Node	Stop Node	Length (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/ft)
P-100	6.0	J-18	BLDG P	21	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-101	6.0	J-19	BLDG O	21	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-102	6.0	J-20	BLDG C	55	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-103	6.0	J-22	BLDG N	24	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-104	8.0	J-48	J-28	160	Ductile Iron	130.0	-7.25	0.05	0.00	0.000
P-105	6.0	BLDG O1	J-48	28	Ductile Iron	130.0	0.00	0.00	0.00	0.000

Active Scenario: Maximum Day Demand

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
BLDG A	43.00	3.00	212.81	73
BLDG A1	41.50	11.90	212.86	74
BLDG B	43.00	3.00	212.81	73
BLDG B1	42.00	11.90	212.86	74
BLDG C	43.50	3.00	212.81	73
BLDG C1	33.50	11.90	212.79	78
BLDG D	43.50	3.00	212.83	73
BLDG D1	33.00	11.90	212.79	78
BLDG E	44.00	3.00	212.83	73
BLDG E1	33.50	11.90	212.80	78
BLDG F	44.00	3.00	212.85	73
BLDG F1	35.50	8.90	212.82	77
BLDG G	45.50	3.00	212.86	72
BLDG G1	37.00	11.90	212.84	76
BLDG H	45.50	3.00	212.88	72
BLDG H1	38.50	11.90	212.86	75
BLDG I	45.50	3.00	212.89	72
BLDG I1	40.00	11.90	212.88	75
BLDG J	45.50	3.00	212.91	72
BLDG J1	37.00	23.80	212.79	76
BLDG K	46.00	3.00	212.92	72
BLDG K1	37.00	23.80	212.78	76
BLDG L	46.00	3.00	212.95	72
BLDG L1	40.00	23.80	212.84	75
BLDG M	40.50	2.40	212.81	75
BLDG M1	38.00	14.43	212.79	76
BLDG N	40.50	2.40	212.81	75
BLDG N1	41.50	0.00	212.79	74
BLDG O	41.50	2.40	212.82	74
BLDG O1	34.50	0.00	212.79	77
BLDG P	41.50	2.40	212.83	74
BLDG Q	42.00	2.40	212.83	74
BLDG R	42.00	2.40	212.84	74
BLDG S	43.50	2.40	212.86	73
BLDG T	43.50	2.40	212.88	73
BLDG U	44.00	2.40	212.89	73
BLDG V	44.00	2.40	212.91	73
BLDG W	44.50	2.40	212.92	73
BLDG X	44.50	2.40	212.95	73
BLDG Y	39.00	11.90	212.79	75
BLDG Z	39.50	11.90	212.79	75
J-1	47.47	0.00	213.03	72
J-2	45.87	0.00	212.99	72
J-3	42.72	0.00	212.97	74
J-4	47.47	0.00	213.08	72
J-5	44.24	0.00	212.95	73
J-6	44.52	0.00	212.92	73
J-7	44.34	0.00	212.91	73

Active Scenario: Maximum Day Demand

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-8	44.05	0.00	212.89	73
J-9	44.00	0.00	212.89	73
J-10	43.93	0.00	212.88	73
J-11	43.54	0.00	212.86	73
J-12	42.74	0.00	212.85	74
J-13	42.60	0.00	212.84	74
J-14	42.24	0.00	212.83	74
J-15	42.17	0.00	212.83	74
J-16	42.09	0.00	212.83	74
J-17	42.06	0.00	212.83	74
J-18	42.00	0.00	212.83	74
J-19	41.63	0.00	212.82	74
J-20	41.52	0.00	212.81	74
J-21	41.28	0.00	212.81	74
J-22	41.18	0.00	212.81	74
J-23	41.23	0.00	212.81	74
J-24	40.90	0.00	212.81	74
J-25	37.88	0.00	212.79	76
J-26	36.56	0.00	212.79	76
J-27	36.73	0.00	212.79	76
J-28	33.99	0.00	212.79	77
J-29	35.01	0.00	212.80	77
J-30	34.70	0.00	212.80	77
J-31	34.92	0.00	212.80	77
J-32	37.19	0.00	212.82	76
J-33	37.41	0.00	212.83	76
J-34	37.94	0.00	212.84	76
J-35	36.94	0.00	212.84	76
J-36	38.73	0.00	212.86	75
J-37	40.25	0.00	212.88	75
J-38	41.72	0.00	212.89	74
J-39	38.40	0.00	212.79	75
J-40	38.81	0.00	212.79	75
J-41	38.98	0.00	212.79	75
J-42	37.36	0.00	212.79	76
J-43	36.47	0.00	212.79	76
J-44	41.46	0.00	212.86	74
J-45	41.25	0.00	212.85	74
J-46	39.49	0.00	212.84	75
J-47	41.68	0.00	212.86	74
J-48	35.33	0.00	212.79	77

Active Scenario: Maximum Day Demand

Hydrant Table - Time: 0.00 hours

Label	Elevation (ft)	Length (Hydrant Lateral) (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-2	47.47	20	0.00	213.08	72
H-3	43.59	20	0.00	212.89	73
H-4	41.58	20	0.00	212.83	74
H-5	37.02	20	0.00	212.79	76
H-6	36.34	20	0.00	212.79	76
H-7	35.71	20	0.00	212.80	77
H-8	37.51	20	0.00	212.84	76
H-9	40.89	20	0.00	212.85	74

Reservoir Table - Time: 0.00 hours

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	47.47	278.53	47.47

Pump Table - Time: 0.00 hours

Label	Elevation (ft)	Pump Definition	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-3	47.47	Flow Test	47.46	213.08	278.53	165.62

APPENDIX D: Peak Hour Demand Results

Pipe Table

Junction Table

Hydrant Table

Reservoir Table

Pump Table

Active Scenario: Peak Hour Demand

FlexTable: Pipe Table

Label	Diameter (in)	Start Node	Stop Node	Length (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/ft)
P-1	12.0	J-1	J-2	157	Ductile Iron	130.0	503.51	1.43	0.11	0.001
P-2	12.0	J-1	J-4	199	Ductile Iron	130.0	-503.51	1.43	0.14	0.001
P-3	6.0	J-4	H-2	37	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-4	8.0	J-2	J-5	136	Ductile Iron	130.0	203.10	1.30	0.13	0.001
P-5	8.0	J-5	J-6	86	Ductile Iron	130.0	194.10	1.24	0.08	0.001
P-6	8.0	J-6	J-7	45	Ductile Iron	130.0	185.10	1.18	0.04	0.001
P-7	8.0	J-7	J-8	86	Ductile Iron	130.0	176.10	1.12	0.06	0.001
P-8	8.0	J-8	J-9	17	Ductile Iron	130.0	167.10	1.07	0.01	0.001
P-9	8.0	J-9	J-10	29	Ductile Iron	130.0	167.10	1.07	0.02	0.001
P-10	8.0	J-10	J-11	86	Ductile Iron	130.0	158.10	1.01	0.05	0.001
P-11	8.0	J-11	J-12	97	Ductile Iron	130.0	149.10	0.95	0.05	0.001
P-12	8.0	J-12	J-13	17	Ductile Iron	130.0	144.10	0.92	0.01	0.001
P-13	8.0	J-13	J-14	69	Ductile Iron	130.0	140.10	0.89	0.03	0.000
P-14	8.0	J-14	J-15	17	Ductile Iron	130.0	135.10	0.86	0.01	0.000
P-15	8.0	J-15	J-16	21	Ductile Iron	130.0	131.10	0.84	0.01	0.000
P-16	8.0	J-16	J-17	10	Ductile Iron	130.0	131.10	0.84	0.00	0.000
P-17	8.0	J-17	J-18	14	Ductile Iron	130.0	126.10	0.80	0.01	0.000
P-18	8.0	J-18	J-19	85	Ductile Iron	130.0	122.10	0.78	0.03	0.000
P-19	8.0	J-19	J-20	11	Ductile Iron	130.0	118.10	0.75	0.00	0.000
P-20	8.0	J-20	J-21	23	Ductile Iron	130.0	113.10	0.72	0.01	0.000
P-21	8.0	J-21	J-22	10	Ductile Iron	130.0	108.10	0.69	0.00	0.000
P-22	8.0	J-22	J-23	39	Ductile Iron	130.0	104.10	0.66	0.01	0.000
P-23	6.0	J-5	BLDG X	25	Ductile Iron	130.0	4.00	0.05	0.00	0.000
P-24	6.0	J-5	BLDG L	26	Ductile Iron	130.0	5.00	0.06	0.00	0.000
P-25	8.0	J-23	J-24	9	Ductile Iron	130.0	99.10	0.63	0.00	0.000
P-26	8.0	J-24	J-25	206	Ductile Iron	130.0	95.10	0.61	0.05	0.000
P-27	8.0	J-25	J-26	83	Ductile Iron	130.0	31.29	0.20	0.00	0.000
P-28	8.0	J-26	J-27	16	Ductile Iron	130.0	-10.71	0.07	0.00	0.000
P-29	8.0	J-27	J-48	166	Ductile Iron	130.0	-10.71	0.07	0.00	0.000
P-30	8.0	J-28	J-29	154	Ductile Iron	130.0	-34.43	0.22	0.01	0.000
P-31	8.0	J-29	J-30	41	Ductile Iron	130.0	-34.43	0.22	0.00	0.000
P-32	8.0	J-30	J-31	26	Ductile Iron	130.0	-116.41	0.74	0.01	0.000
P-33	8.0	J-31	J-32	178	Ductile Iron	130.0	-137.41	0.88	0.08	0.000
P-34	6.0	J-32	BLDG F1	45	Ductile Iron	130.0	16.00	0.18	0.00	0.000
P-35	8.0	J-32	J-33	29	Ductile Iron	130.0	-153.41	0.98	0.02	0.001
P-36	8.0	J-33	J-34	150	Ductile Iron	130.0	-79.74	0.51	0.03	0.000
P-37	8.0	J-35	J-36	143	Ductile Iron	130.0	-100.74	0.64	0.04	0.000
P-38	8.0	J-36	J-37	192	Ductile Iron	130.0	-121.74	0.78	0.07	0.000
P-39	8.0	J-37	J-38	39	Ductile Iron	130.0	-142.74	0.91	0.02	0.000
P-40	8.0	J-38	J-3	136	Ductile Iron	130.0	-300.41	1.92	0.27	0.002
P-41	12.0	PMP-3	J-4	28	Ductile Iron	130.0	503.51	1.43	0.02	0.001
P-42	12.0	R-1	PMP-3	24	Ductile Iron	130.0	503.51	1.43	0.02	0.001
P-43	6.0	J-47	BLDG A1	6	Ductile Iron	130.0	21.00	0.24	0.00	0.000
P-44	6.0	J-47	BLDG B1	9	Ductile Iron	130.0	21.00	0.24	0.00	0.000
P-45	6.0	J-44	J-47	24	Ductile Iron	130.0	42.00	0.48	0.00	0.000
P-46	8.0	J-34	J-35	117	Ductile Iron	130.0	-79.74	0.51	0.02	0.000
P-47	6.0	J-40	BLDG K1	84	Ductile Iron	130.0	42.00	0.48	0.02	0.000
P-48	6.0	J-40	BLDG Z	24	Ductile Iron	130.0	21.00	0.24	0.00	0.000

Active Scenario: Peak Hour Demand

FlexTable: Pipe Table

Label	Diameter (in)	Start Node	Stop Node	Length (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/ft)
P-49	6.0	J-24	BLDG M	44	Ductile Iron	130.0	4.00	0.05	0.00	0.000
P-50	6.0	J-36	BLDG H1	24	Ductile Iron	130.0	21.00	0.24	0.00	0.000
P-51	6.0	J-35	BLDG G1	31	Ductile Iron	130.0	21.00	0.24	0.00	0.000
P-52	6.0	J-37	BLDG I1	23	Ductile Iron	130.0	21.00	0.24	0.00	0.000
P-53	6.0	J-43	BLDG M1	51	Ductile Iron	130.0	25.25	0.29	0.00	0.000
P-54	6.0	J-27	H-6	17	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-55	6.0	J-26	BLDG J1	23	Ductile Iron	130.0	42.00	0.48	0.00	0.000
P-56	6.0	J-39	BLDG Y	23	Ductile Iron	130.0	21.00	0.24	0.00	0.000
P-57	6.0	J-23	BLDG A	64	Ductile Iron	130.0	5.00	0.06	0.00	0.000
P-58	6.0	J-21	BLDG B	28	Ductile Iron	130.0	5.00	0.06	0.00	0.000
P-59	8.0	J-25	J-39	21	Ductile Iron	130.0	63.81	0.41	0.00	0.000
P-60	8.0	J-39	J-40	185	Ductile Iron	130.0	42.81	0.27	0.01	0.000
P-61	8.0	J-40	J-41	160	Ductile Iron	130.0	-20.19	0.13	0.00	0.000
P-62	8.0	J-41	J-42	35	Ductile Iron	130.0	-35.73	0.23	0.00	0.000
P-63	8.0	J-42	J-43	144	Ductile Iron	130.0	-35.73	0.23	0.01	0.000
P-64	8.0	J-43	J-30	92	Ductile Iron	130.0	-60.98	0.39	0.01	0.000
P-65	6.0	J-31	BLDG E1	22	Ductile Iron	130.0	21.00	0.24	0.00	0.000
P-66	6.0	J-30	BLDG D1	138	Ductile Iron	130.0	21.00	0.24	0.01	0.000
P-68	6.0	J-6	BLDG K	29	Ductile Iron	130.0	5.00	0.06	0.00	0.000
P-69	6.0	J-6	BLDG W	21	Ductile Iron	130.0	4.00	0.05	0.00	0.000
P-70	6.0	J-7	BLDG V	22	Ductile Iron	130.0	4.00	0.05	0.00	0.000
P-71	6.0	J-7	BLDG J	28	Ductile Iron	130.0	5.00	0.06	0.00	0.000
P-72	6.0	J-8	BLDG U	22	Ductile Iron	130.0	4.00	0.05	0.00	0.000
P-73	6.0	J-8	BLDG I	29	Ductile Iron	130.0	5.00	0.06	0.00	0.000
P-74	8.0	J-38	J-44	118	Ductile Iron	130.0	157.67	1.01	0.07	0.001
P-75	8.0	J-44	J-45	101	Ductile Iron	130.0	115.67	0.74	0.03	0.000
P-76	8.0	J-45	J-46	119	Ductile Iron	130.0	115.67	0.74	0.04	0.000
P-77	8.0	J-46	J-33	193	Ductile Iron	130.0	73.67	0.47	0.03	0.000
P-78	6.0	J-9	H-3	17	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-79	6.0	J-11	BLDG S	21	Ductile Iron	130.0	4.00	0.05	0.00	0.000
P-80	6.0	J-11	BLDG G	30	Ductile Iron	130.0	5.00	0.06	0.00	0.000
P-81	6.0	J-12	BLDG F	28	Ductile Iron	130.0	5.00	0.06	0.00	0.000
P-82	6.0	J-14	BLDG E	28	Ductile Iron	130.0	5.00	0.06	0.00	0.000
P-83	12.0	J-2	J-3	213	Ductile Iron	130.0	300.41	0.85	0.06	0.000
P-85	6.0	J-16	H-4	17	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-86	6.0	J-42	H-5	18	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-87	6.0	J-29	H-7	15	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-88	6.0	J-34	H-8	18	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-89	6.0	J-45	H-9	19	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-90	6.0	J-41	BLDG N1	113	Ductile Iron	130.0	15.54	0.18	0.00	0.000
P-91	6.0	J-46	BLDG L1	31	Ductile Iron	130.0	42.00	0.48	0.01	0.000
P-92	6.0	J-28	BLDG C1	106	Ductile Iron	130.0	21.00	0.24	0.01	0.000
P-95	6.0	J-10	BLDG T	21	Ductile Iron	130.0	4.00	0.05	0.00	0.000
P-96	6.0	J-10	BLDG H	29	Ductile Iron	130.0	5.00	0.06	0.00	0.000
P-97	6.0	J-13	BLDG R	21	Ductile Iron	130.0	4.00	0.05	0.00	0.000
P-98	6.0	J-15	BLDG Q	21	Ductile Iron	130.0	4.00	0.05	0.00	0.000
P-99	6.0	J-17	BLDG D	28	Ductile Iron	130.0	5.00	0.06	0.00	0.000

Active Scenario: Peak Hour Demand

FlexTable: Pipe Table

Label	Diameter (in)	Start Node	Stop Node	Length (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/ft)
P-100	6.0	J-18	BLDG P	21	Ductile Iron	130.0	4.00	0.05	0.00	0.000
P-101	6.0	J-19	BLDG O	21	Ductile Iron	130.0	4.00	0.05	0.00	0.000
P-102	6.0	J-20	BLDG C	55	Ductile Iron	130.0	5.00	0.06	0.00	0.000
P-103	6.0	J-22	BLDG N	24	Ductile Iron	130.0	4.00	0.05	0.00	0.000
P-104	8.0	J-48	J-28	160	Ductile Iron	130.0	-13.43	0.09	0.00	0.000
P-105	6.0	BLDG O1	J-48	28	Ductile Iron	130.0	-2.72	0.03	0.00	0.000

Active Scenario: Peak Hour Demand

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
BLDG A	43.00	5.00	211.24	73
BLDG A1	41.50	21.00	211.40	74
BLDG B	43.00	5.00	211.25	73
BLDG B1	42.00	21.00	211.40	73
BLDG C	43.50	5.00	211.26	73
BLDG C1	33.50	21.00	211.18	77
BLDG D	43.50	5.00	211.30	73
BLDG D1	33.00	21.00	211.19	77
BLDG E	44.00	5.00	211.32	72
BLDG E1	33.50	21.00	211.20	77
BLDG F	44.00	5.00	211.36	72
BLDG F1	35.50	16.00	211.29	76
BLDG G	45.50	5.00	211.42	72
BLDG G1	37.00	21.00	211.35	75
BLDG H	45.50	5.00	211.47	72
BLDG H1	38.50	21.00	211.39	75
BLDG I	45.50	5.00	211.50	72
BLDG I1	40.00	21.00	211.46	74
BLDG J	45.50	5.00	211.56	72
BLDG J1	37.00	42.00	211.18	75
BLDG K	46.00	5.00	211.60	72
BLDG K1	37.00	42.00	211.16	75
BLDG L	46.00	5.00	211.67	72
BLDG L1	40.00	42.00	211.33	74
BLDG M	40.50	4.00	211.24	74
BLDG M1	38.00	25.25	211.18	75
BLDG N	40.50	4.00	211.25	74
BLDG N1	41.50	15.54	211.18	73
BLDG O	41.50	4.00	211.27	73
BLDG O1	34.50	2.72	211.19	76
BLDG P	41.50	4.00	211.30	73
BLDG Q	42.00	4.00	211.32	73
BLDG R	42.00	4.00	211.36	73
BLDG S	43.50	4.00	211.42	73
BLDG T	43.50	4.00	211.47	73
BLDG U	44.00	4.00	211.50	72
BLDG V	44.00	4.00	211.56	72
BLDG W	44.50	4.00	211.60	72
BLDG X	44.50	4.00	211.67	72
BLDG Y	39.00	21.00	211.19	74
BLDG Z	39.50	21.00	211.18	74
J-1	47.47	0.00	211.91	71
J-2	45.87	0.00	211.80	72
J-3	42.72	0.00	211.74	73
J-4	47.47	0.00	212.06	71
J-5	44.24	0.00	211.67	72
J-6	44.52	0.00	211.60	72
J-7	44.34	0.00	211.56	72

Active Scenario: Peak Hour Demand

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-8	44.05	0.00	211.50	72
J-9	44.00	0.00	211.49	72
J-10	43.93	0.00	211.47	72
J-11	43.54	0.00	211.42	73
J-12	42.74	0.00	211.37	73
J-13	42.60	0.00	211.36	73
J-14	42.24	0.00	211.32	73
J-15	42.17	0.00	211.32	73
J-16	42.09	0.00	211.31	73
J-17	42.06	0.00	211.30	73
J-18	42.00	0.00	211.30	73
J-19	41.63	0.00	211.27	73
J-20	41.52	0.00	211.26	73
J-21	41.28	0.00	211.25	74
J-22	41.18	0.00	211.25	74
J-23	41.23	0.00	211.24	74
J-24	40.90	0.00	211.24	74
J-25	37.88	0.00	211.19	75
J-26	36.56	0.00	211.19	76
J-27	36.73	0.00	211.19	75
J-28	33.99	0.00	211.19	77
J-29	35.01	0.00	211.20	76
J-30	34.70	0.00	211.20	76
J-31	34.92	0.00	211.21	76
J-32	37.19	0.00	211.29	75
J-33	37.41	0.00	211.30	75
J-34	37.94	0.00	211.33	75
J-35	36.94	0.00	211.35	75
J-36	38.73	0.00	211.39	75
J-37	40.25	0.00	211.46	74
J-38	41.72	0.00	211.48	73
J-39	38.40	0.00	211.19	75
J-40	38.81	0.00	211.18	75
J-41	38.98	0.00	211.18	75
J-42	37.36	0.00	211.18	75
J-43	36.47	0.00	211.19	76
J-44	41.46	0.00	211.41	74
J-45	41.25	0.00	211.37	74
J-46	39.49	0.00	211.33	74
J-47	41.68	0.00	211.40	73
J-48	35.33	0.00	211.19	76

Active Scenario: Peak Hour Demand

Hydrant Table - Time: 0.00 hours

Label	Elevation (ft)	Length (Hydrant Lateral) (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-2	47.47	20	0.00	212.06	71
H-3	43.59	20	0.00	211.49	73
H-4	41.58	20	0.00	211.31	73
H-5	37.02	20	0.00	211.18	75
H-6	36.34	20	0.00	211.19	76
H-7	35.71	20	0.00	211.20	76
H-8	37.51	20	0.00	211.33	75
H-9	40.89	20	0.00	211.37	74

Reservoir Table - Time: 0.00 hours

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	47.47	503.51	47.47

Pump Table - Time: 0.00 hours

Label	Elevation (ft)	Pump Definition	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-3	47.47	Flow Test	47.45	212.08	503.51	164.62

APPENDIX E: Maximum Day Demand + Fire Flow Results

Pipe Table

Junction Table

Hydrant Table

Reservoir Table

Pump Table

Active Scenario: Maximum Day + Fire Flow Demand

FlexTable: Pipe Table

Label	Diameter (in)	Start Node	Stop Node	Length (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/ft)
P-1	12.0	J-1	J-2	157	Ductile Iron	130.0	1,841.03	5.22	1.23	0.008
P-2	12.0	J-1	J-4	199	Ductile Iron	130.0	-1,841.03	5.22	1.56	0.008
P-3	6.0	J-4	H-2	37	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-4	8.0	J-2	J-5	136	Ductile Iron	130.0	863.07	5.51	1.89	0.014
P-5	8.0	J-5	J-6	86	Ductile Iron	130.0	857.67	5.47	1.18	0.014
P-6	8.0	J-6	J-7	45	Ductile Iron	130.0	852.27	5.44	0.62	0.014
P-7	8.0	J-7	J-8	86	Ductile Iron	130.0	846.87	5.41	1.15	0.013
P-8	8.0	J-8	J-9	17	Ductile Iron	130.0	841.47	5.37	0.23	0.013
P-9	8.0	J-9	J-10	29	Ductile Iron	130.0	60.22	0.38	0.00	0.000
P-10	8.0	J-10	J-11	86	Ductile Iron	130.0	54.82	0.35	0.01	0.000
P-11	8.0	J-11	J-12	97	Ductile Iron	130.0	49.42	0.32	0.01	0.000
P-12	8.0	J-12	J-13	17	Ductile Iron	130.0	46.42	0.30	0.00	0.000
P-13	8.0	J-13	J-14	69	Ductile Iron	130.0	44.02	0.28	0.00	0.000
P-14	8.0	J-14	J-15	17	Ductile Iron	130.0	41.02	0.26	0.00	0.000
P-15	8.0	J-15	J-16	21	Ductile Iron	130.0	38.62	0.25	0.00	0.000
P-16	8.0	J-16	J-17	10	Ductile Iron	130.0	38.62	0.25	0.00	0.000
P-17	8.0	J-17	J-18	14	Ductile Iron	130.0	35.62	0.23	0.00	0.000
P-18	8.0	J-18	J-19	85	Ductile Iron	130.0	33.22	0.21	0.00	0.000
P-19	8.0	J-19	J-20	11	Ductile Iron	130.0	30.82	0.20	0.00	0.000
P-20	8.0	J-20	J-21	23	Ductile Iron	130.0	27.82	0.18	0.00	0.000
P-21	8.0	J-21	J-22	10	Ductile Iron	130.0	24.82	0.16	0.00	0.000
P-22	8.0	J-22	J-23	39	Ductile Iron	130.0	22.42	0.14	0.00	0.000
P-23	6.0	J-5	BLDG X	25	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-24	6.0	J-5	BLDG L	26	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-25	8.0	J-23	J-24	9	Ductile Iron	130.0	19.42	0.12	0.00	0.000
P-26	8.0	J-24	J-25	206	Ductile Iron	130.0	17.02	0.11	0.00	0.000
P-27	8.0	J-25	J-26	83	Ductile Iron	130.0	-0.63	0.00	0.00	0.000
P-28	8.0	J-26	J-27	16	Ductile Iron	130.0	-24.43	0.16	0.00	0.000
P-29	8.0	J-27	J-48	166	Ductile Iron	130.0	-24.43	0.16	0.00	0.000
P-30	8.0	J-28	J-29	154	Ductile Iron	130.0	-36.33	0.23	0.01	0.000
P-31	8.0	J-29	J-30	41	Ductile Iron	130.0	-36.33	0.23	0.00	0.000
P-32	8.0	J-30	J-31	26	Ductile Iron	130.0	-92.61	0.59	0.01	0.000
P-33	8.0	J-31	J-32	178	Ductile Iron	130.0	-104.51	0.67	0.05	0.000
P-34	6.0	J-32	BLDG F1	45	Ductile Iron	130.0	8.90	0.10	0.00	0.000
P-35	8.0	J-32	J-33	29	Ductile Iron	130.0	-113.41	0.72	0.01	0.000
P-36	8.0	J-33	J-34	150	Ductile Iron	130.0	304.64	1.94	0.30	0.002
P-37	8.0	J-35	J-36	143	Ductile Iron	130.0	-488.51	3.12	0.69	0.005
P-38	8.0	J-36	J-37	192	Ductile Iron	130.0	-500.41	3.19	0.97	0.005
P-39	8.0	J-37	J-38	39	Ductile Iron	130.0	-512.31	3.27	0.21	0.005
P-40	8.0	J-38	J-3	136	Ductile Iron	130.0	-977.96	6.24	2.38	0.018
P-41	12.0	PMP-3	J-4	28	Ductile Iron	130.0	1,841.03	5.22	0.22	0.008
P-42	12.0	R-1	PMP-3	24	Ductile Iron	130.0	1,841.03	5.22	0.19	0.008
P-43	6.0	J-47	BLDG A1	6	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-44	6.0	J-47	BLDG B1	9	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-45	6.0	J-44	J-47	24	Ductile Iron	130.0	23.80	0.27	0.00	0.000
P-46	8.0	J-34	J-35	117	Ductile Iron	130.0	-476.61	3.04	0.54	0.005
P-47	6.0	J-40	BLDG K1	84	Ductile Iron	130.0	23.80	0.27	0.01	0.000

Active Scenario: Maximum Day + Fire Flow Demand

FlexTable: Pipe Table

Label	Diameter (in)	Start Node	Stop Node	Length (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/ft)
P-48	6.0	J-40	BLDG Z	24	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-49	6.0	J-24	BLDG M	44	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-50	6.0	J-36	BLDG H1	24	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-51	6.0	J-35	BLDG G1	31	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-52	6.0	J-37	BLDG I1	23	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-53	6.0	J-43	BLDG M1	51	Ductile Iron	130.0	14.43	0.16	0.00	0.000
P-54	6.0	J-27	H-6	17	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-55	6.0	J-26	BLDG J1	23	Ductile Iron	130.0	23.80	0.27	0.00	0.000
P-56	6.0	J-39	BLDG Y	23	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-57	6.0	J-23	BLDG A	64	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-58	6.0	J-21	BLDG B	28	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-59	8.0	J-25	J-39	21	Ductile Iron	130.0	17.65	0.11	0.00	0.000
P-60	8.0	J-39	J-40	185	Ductile Iron	130.0	5.75	0.04	0.00	0.000
P-61	8.0	J-40	J-41	160	Ductile Iron	130.0	-29.95	0.19	0.00	0.000
P-62	8.0	J-41	J-42	35	Ductile Iron	130.0	-29.95	0.19	0.00	0.000
P-63	8.0	J-42	J-43	144	Ductile Iron	130.0	-29.95	0.19	0.00	0.000
P-64	8.0	J-43	J-30	92	Ductile Iron	130.0	-44.38	0.28	0.01	0.000
P-65	6.0	J-31	BLDG E1	22	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-66	6.0	J-30	BLDG D1	138	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-68	6.0	J-6	BLDG K	29	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-69	6.0	J-6	BLDG W	21	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-70	6.0	J-7	BLDG V	22	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-71	6.0	J-7	BLDG J	28	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-72	6.0	J-8	BLDG U	22	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-73	6.0	J-8	BLDG I	29	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-74	8.0	J-38	J-44	118	Ductile Iron	130.0	465.65	2.97	0.52	0.004
P-75	8.0	J-44	J-45	101	Ductile Iron	130.0	441.85	2.82	0.41	0.004
P-76	8.0	J-45	J-46	119	Ductile Iron	130.0	441.85	2.82	0.48	0.004
P-77	8.0	J-46	J-33	193	Ductile Iron	130.0	418.05	2.67	0.70	0.004
P-78	6.0	J-9	H-3	17	Ductile Iron	130.0	781.25	8.86	0.78	0.047
P-79	6.0	J-11	BLDG S	21	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-80	6.0	J-11	BLDG G	30	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-81	6.0	J-12	BLDG F	28	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-82	6.0	J-14	BLDG E	28	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-83	12.0	J-2	J-3	213	Ductile Iron	130.0	977.96	2.77	0.52	0.002
P-85	6.0	J-16	H-4	17	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-86	6.0	J-42	H-5	18	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-87	6.0	J-29	H-7	15	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-88	6.0	J-34	H-8	18	Ductile Iron	130.0	781.25	8.86	0.83	0.047
P-89	6.0	J-45	H-9	19	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-90	6.0	J-41	BLDG N1	113	Ductile Iron	130.0	0.00	0.00	0.00	0.000
P-91	6.0	J-46	BLDG L1	31	Ductile Iron	130.0	23.80	0.27	0.00	0.000
P-92	6.0	J-28	BLDG C1	106	Ductile Iron	130.0	11.90	0.14	0.00	0.000
P-95	6.0	J-10	BLDG T	21	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-96	6.0	J-10	BLDG H	29	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-97	6.0	J-13	BLDG R	21	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-98	6.0	J-15	BLDG Q	21	Ductile Iron	130.0	2.40	0.03	0.00	0.000

Active Scenario: Maximum Day + Fire Flow Demand

FlexTable: Pipe Table

Label	Diameter (in)	Start Node	Stop Node	Length (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/ft)
P-99	6.0	J-17	BLDG D	28	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-100	6.0	J-18	BLDG P	21	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-101	6.0	J-19	BLDG O	21	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-102	6.0	J-20	BLDG C	55	Ductile Iron	130.0	3.00	0.03	0.00	0.000
P-103	6.0	J-22	BLDG N	24	Ductile Iron	130.0	2.40	0.03	0.00	0.000
P-104	8.0	J-48	J-28	160	Ductile Iron	130.0	-24.43	0.16	0.00	0.000
P-105	6.0	BLDG O1	J-48	28	Ductile Iron	130.0	0.00	0.00	0.00	0.000

Active Scenario: Maximum Day + Fire Flow Demand

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
BLDG A	43.00	3.00	188.78	63
BLDG A1	41.50	11.90	190.44	64
BLDG B	43.00	3.00	188.78	63
BLDG B1	42.00	11.90	190.44	64
BLDG C	43.50	3.00	188.78	63
BLDG C1	33.50	11.90	188.78	67
BLDG D	43.50	3.00	188.79	63
BLDG D1	33.00	11.90	188.79	67
BLDG E	44.00	3.00	188.79	63
BLDG E1	33.50	11.90	188.80	67
BLDG F	44.00	3.00	188.79	63
BLDG F1	35.50	8.90	188.85	66
BLDG G	45.50	3.00	188.80	62
BLDG G1	37.00	11.90	189.10	66
BLDG H	45.50	3.00	188.81	62
BLDG H1	38.50	11.90	189.79	65
BLDG I	45.50	3.00	189.04	62
BLDG I1	40.00	11.90	190.76	65
BLDG J	45.50	3.00	190.19	63
BLDG J1	37.00	23.80	188.78	66
BLDG K	46.00	3.00	190.81	63
BLDG K1	37.00	23.80	188.77	66
BLDG L	46.00	3.00	191.98	63
BLDG L1	40.00	23.80	189.56	65
BLDG M	40.50	2.40	188.78	64
BLDG M1	38.00	14.43	188.79	65
BLDG N	40.50	2.40	188.78	64
BLDG N1	41.50	0.00	188.78	64
BLDG O	41.50	2.40	188.78	64
BLDG O1	34.50	0.00	188.78	67
BLDG P	41.50	2.40	188.79	64
BLDG Q	42.00	2.40	188.79	64
BLDG R	42.00	2.40	188.79	64
BLDG S	43.50	2.40	188.80	63
BLDG T	43.50	2.40	188.81	63
BLDG U	44.00	2.40	189.04	63
BLDG V	44.00	2.40	190.19	63
BLDG W	44.50	2.40	190.81	63
BLDG X	44.50	2.40	191.98	64
BLDG Y	39.00	11.90	188.78	65
BLDG Z	39.50	11.90	188.78	65
J-1	47.47	0.00	195.10	64
J-2	45.87	0.00	193.87	64
J-3	42.72	0.00	193.35	65
J-4	47.47	0.00	196.67	65
J-5	44.24	0.00	191.98	64
J-6	44.52	0.00	190.81	63
J-7	44.34	0.00	190.19	63

Active Scenario: Maximum Day + Fire Flow Demand

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-8	44.05	0.00	189.04	63
J-9	44.00	0.00	188.81	63
J-10	43.93	0.00	188.81	63
J-11	43.54	0.00	188.80	63
J-12	42.74	0.00	188.79	63
J-13	42.60	0.00	188.79	63
J-14	42.24	0.00	188.79	63
J-15	42.17	0.00	188.79	63
J-16	42.09	0.00	188.79	63
J-17	42.06	0.00	188.79	63
J-18	42.00	0.00	188.79	64
J-19	41.63	0.00	188.78	64
J-20	41.52	0.00	188.78	64
J-21	41.28	0.00	188.78	64
J-22	41.18	0.00	188.78	64
J-23	41.23	0.00	188.78	64
J-24	40.90	0.00	188.78	64
J-25	37.88	0.00	188.78	65
J-26	36.56	0.00	188.78	66
J-27	36.73	0.00	188.78	66
J-28	33.99	0.00	188.79	67
J-29	35.01	0.00	188.79	67
J-30	34.70	0.00	188.79	67
J-31	34.92	0.00	188.80	67
J-32	37.19	0.00	188.85	66
J-33	37.41	0.00	188.86	66
J-34	37.94	0.00	188.55	65
J-35	36.94	0.00	189.10	66
J-36	38.73	0.00	189.79	65
J-37	40.25	0.00	190.76	65
J-38	41.72	0.00	190.97	65
J-39	38.40	0.00	188.78	65
J-40	38.81	0.00	188.78	65
J-41	38.98	0.00	188.78	65
J-42	37.36	0.00	188.78	66
J-43	36.47	0.00	188.79	66
J-44	41.46	0.00	190.44	64
J-45	41.25	0.00	190.04	64
J-46	39.49	0.00	189.56	65
J-47	41.68	0.00	190.44	64
J-48	35.33	0.00	188.78	66

Active Scenario: Maximum Day + Fire Flow Demand

Hydrant Table - Time: 0.00 hours

Label	Elevation (ft)	Length (Hydrant Lateral) (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-2	47.47	20	0.00	196.67	65
H-3	43.59	20	781.25	188.03	62
H-4	41.58	20	0.00	188.79	64
H-5	37.02	20	0.00	188.78	66
H-6	36.34	20	0.00	188.78	66
H-7	35.71	20	0.00	188.79	66
H-8	37.51	20	781.25	187.72	65
H-9	40.89	20	0.00	190.04	65

Reservoir Table - Time: 0.00 hours

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	47.47	1,841.03	47.47

Pump Table - Time: 0.00 hours

Label	Elevation (ft)	Pump Definition	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-3	47.47	Flow Test	47.28	196.89	1,841.03	149.61

APPENDIX F: Fire Hydrant Flow Test Results

Flow Test Summary

Project Name:	EJFT 23255-1 - Legacy & Miller
Project Address:	E Thompson Peak Pkwy & 76th St, Scottsdale, az 85255
Date of Flow Test:	2023-06-16
Time of Flow Test:	7:15 AM
Data Reliable Until:	2023-12-16
Conducted By:	Steven Saethre & Sheila Schauble (EJ Flow Test) 602.999.7637
Witnessed By:	Vince Cusumano (City of Scottsdale) 480.312.5761
City Forces Contacted:	City of Scottsdale (480.312.5761)
Permit Number:	C72617

Note Scottsdale Requires a Maximum Static Pressure of 72 psi for Safety

Raw Flow Test Data

Static Pressure:	104.0 PSI
Residual Pressure:	90.0 PSI
Flowing GPM:	2,645
GPM @ 20 PSI:	6,960

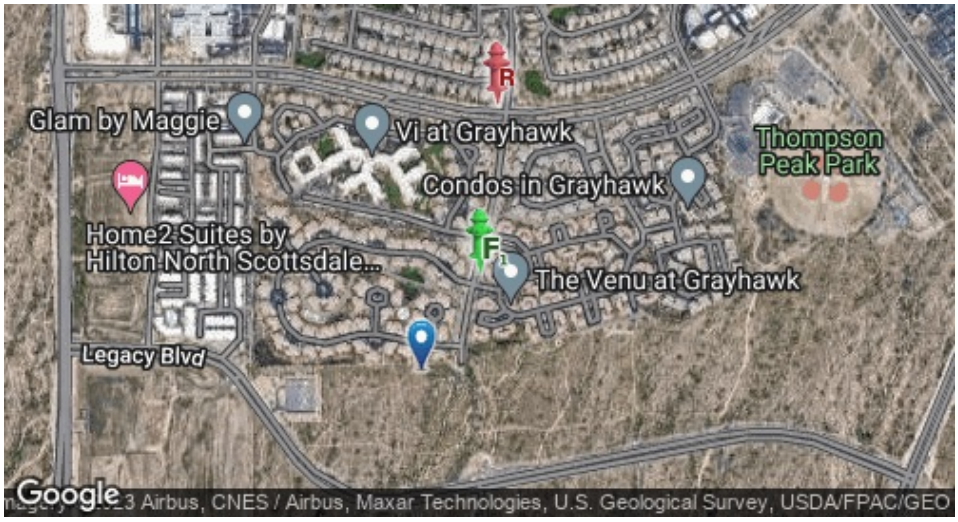
Data with a 32 PSI Safety Factor

Static Pressure:	72.0 PSI
Residual Pressure:	58.0 PSI
Flowing GPM:	2,645
GPM @ 20 PSI:	5,372

Hydrant F_1

Pitot Pressure (1):	55	PSI
Coefficient of Discharge (1):	0.9	
Hydrant Orifice Diameter (1):	4	inches

Additional Coefficient 0.83 on orifice #1



Project Site

Static-Residual Hydrant

Flow Hydrant

Distance Between F_1 and R
1149 ft (measured linearly)

Static-Residual Elevation
1681 ft (above sea level)

Flow Hydrant (F_1) Elevation
1659 ft (above sea level)

Elevation & distance values are approximate

Flow Test Summary

Static-Residual Hydrant



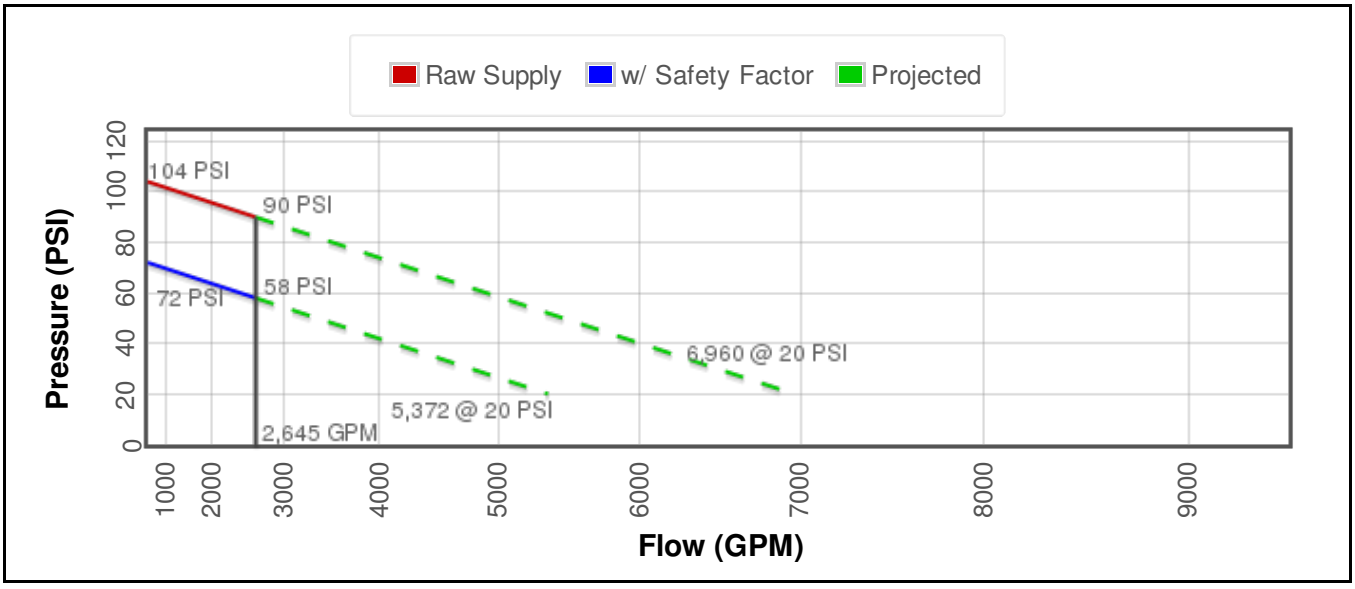
Flow Hydrant (only hydrant F1 shown for clarity)



Approximate Project Site



Water Supply Curve $N^{1.85}$ Graph



Kimley»Horn

APPENDIX G: Fire Flow Requirements from 2018 IFC

APPENDIX B

FIRE-FLOW REQUIREMENTS FOR BUILDINGS

User note:

About this appendix: *Appendix B provides a tool for the use of jurisdictions in establishing a policy for determining fire-flow requirements in accordance with Section 507.3. The determination of required fire flow is not an exact science, but having some level of information provides a consistent way of choosing the appropriate fire flow for buildings throughout a jurisdiction. The primary tool used in this appendix is a table that presents fire flow based on construction type and building area based on the correlation of the Insurance Services Office (ISO) method and the construction types used in the* International Building Code

SECTION B101
GENERAL

B101.1 Scope. The procedure for determining fire-flow requirements for buildings or portions of buildings hereafter constructed shall be in accordance with this appendix. This appendix does not apply to structures other than buildings.

SECTION B102
DEFINITIONS

B102.1 Definitions. For the purpose of this appendix, certain terms are defined as follows:

FIRE-FLOW. The flow rate of a water supply, measured at 20 pounds per square inch (psi) (138 kPa) residual pressure, that is available for firefighting.

FIRE-FLOW CALCULATION AREA. The floor area, in square feet (m^2), used to determine the required fire flow.

SECTION B103
MODIFICATIONS

B103.1 Decreases. The *fire code official* is authorized to reduce the fire-flow requirements for isolated buildings or a group of buildings in rural areas or small communities where the development of full fire-flow requirements is impractical.

B103.2 Increases. The *fire code official* is authorized to increase the fire-flow requirements where conditions indicate an unusual susceptibility to group fires or conflagrations. An increase shall be not more than twice that required for the building under consideration.

B103.3 Areas without water supply systems. For information regarding water supplies for fire-fighting purposes in rural and suburban areas in which adequate and reliable water supply systems do not exist, the *fire code official* is authorized to utilize NFPA 1142 or the *International Wildland-Urban Interface Code.*

B103.4 Outside storage use. The fire code is authorized to require a fire-flow of no less than 2,000 gpm (7571 L/min) where combustible materials, *hazardous materials* and other items are stored or used outside.

SECTION B104
FIRE-FLOW CALCULATION AREA

B104.1 General. The fire-flow calculation area shall be the total floor area of all floor levels within the *exterior walls*, and under the horizontal projections of the roof of a building,

B104.2 Area separation. Portions of buildings that are separated by *fire walls* without openings, constructed in accordance with the *International Building Code*, are allowed to be considered as separate fire-flow calculation areas.

B104.3 Type IA and Type IB construction. The fire-flow calculation area of buildings constructed of Type IA and Type IB construction shall be the area of the three largest successive floors.

Exception: Fire-flow calculation area for open parking garages shall be determined by the area of the largest floor.

SECTION B105
FIRE-FLOW REQUIREMENTS FOR BUILDINGS

B105.1 One- and two-family dwellings, Group R-3 and R-4 buildings and townhouses. The minimum *fire-flow* and flow duration requirements for one- and two-family *dwellings*, Group R-3 and R-4 buildings and *townhouses* shall be as specified in Tables B105.1(1) and B105.1(2).

B105.2 Buildings other than one- and two-family dwellings, Group R-3 and R-4 buildings and townhouses. The minimum *fire-flow* and flow duration for buildings other than one- and two-family *dwellings*, Group R-3 and R-4 buildings and *townhouses* shall be as specified in Tables B105.2 and B105.1(2).

Exception: A reduction in required fire-flow of up to 50 percent, as *approved*, is allowed when the building is provided with an *approved* NFPA 13 *automatic sprinkler system* installed in accordance with Section 903.3.1.1. The resulting fire-flow shall not be less than 1,500 gallons per minute (5678 L/min) for the prescribed duration as specified in Table B105.1. No reductions are allowed for NFPA 13D or 13R systems other than Group R-3 single-family homes.

B105.3 Water supply for buildings equipped with an automatic sprinkler system. For buildings equipped with an *approved automatic sprinkler system*, the water supply shall be capable of providing the greater of:

1. The *automatic sprinkler system* demand, including hose stream allowance.
2. The required *fire flow*.

TABLE B105.1(1)
REQUIRED FIRE FLOW FOR ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES

FIRE-FLOW CALCULATION AREA	AUTOMATIC SPRINKLER SYSTEM (Design Standard)	MINIMUM FIRE FLOW (gallons per minute)	FLOW DURATION (hours)
0–3,600	No automatic sprinkler system	1,000	1
3,601 and greater	No automatic sprinkler system	Value in Table B105.1(2)	Duration in Table B105.1(2) at the required fire-flow rate
0 - 3,600	Section 903.3.1.3 of the *International Fire Code* or Section P2904 of the *International Residential Code*	500	B105.1(2)
3,601 and greater	Section 903.3.1.3 of the *International Fire Code* or Section P2904 of the *International Residential Code*	½ value in Table B105.1(2)	Duration in Table B105.1(2)

TABLE B105.1(2)
MINIMUM REQUIRED FIRE-FLOW AND FLOW DURATION FOR BUILDINGS

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute)[b]	FLOW DURATION (hours)
Type IA and IB[a]	Type IIA and IIIA[a]	Type IV and V-A[a]	Type IIB and IIIB[a]	Type V-B[a]		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

For SI: 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. Types of construction are based on the *International Building Code*.

b. Measured at 20 psi residual pressure.

TABLE B105.2
REQUIRED FIRE FLOW FOR BUILDINGS OTHER THAN ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES

AUTOMATIC SPRINKLER SYSTEM (Design Standard)	MINIMUM FIRE FLOW (gallons per minute)	FLOW DURATION (hours)
No automatic sprinkler system	Value in Table B105.1(2)	Duration in Table B105.1(2)
Section 903.3.1.1 of the *International Fire Code*	25% of the value in Table B105.1(2)[a]	Duration in Table B105.1(2) at the reduced flow rate
Section 903.3.1.2 of the *International Fire Code*	25% of the value in Table B105.1(2)[b]	Duration in Table B105.1(2) at the reduced flow rate

For SI: 1 gallon per minute = 3.785 L/m.
a. The reduced fire flow shall be not less than 1,000 gallons per minute.
b. The reduced fire flow shall be not less than 1,500 gallons per minute.

SECTION B106
REFERENCED STANDARDS

ICC	IBC—18	International Building Code	B104.2
ICC	IWUIC—18	International Wildland-Urban Interface Code	B103.3
ICC	IRC—18	International Residential Code	Table 105.1(1)
NFPA	1142—17	Standard on Water Supplies for Suburban and Rural Fire Fighting	

B106.1 Additional requirements. See Chapter 5 of this code for additional requirements.

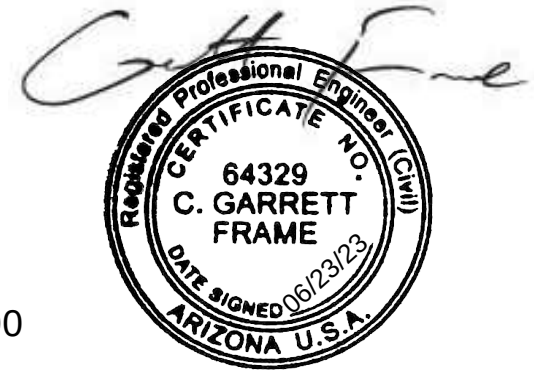
Master and Final Wastewater Basis of Design Report

Legacy North

NWC Legacy Boulevard and Miller Road

Prepared for:

The Dinerstein Companies
1010 S. Coast Highway 101, Ste 106
Encinitas, CA 92024



Prepared by:

Kimley-Horn & Associates, Inc.
7740 North 16th Street, Suite 300
Phoenix, AZ 85020

Kimley»Horn

291878000
June 2023
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Legacy North

MASTER AND FINAL WASTEWATER BASIS OF DESIGN REPORT

JUNE 2023

Prepared By:

Kimley»Horn

Kimley»Horn

Contents

1.0 Introduction 1

2.0 Wastewater Collection System 2

2.1 Intent and Scope 2

2.2 Sewer Infrastructure 2

2.3 Wastewater Design Flows 3

2.4 Analysis 3

3.0 Conclusion 4

4.0 References 4

Appendices

Appendix A: Exhibits

Exhibit 1 – Vicinity Map

Exhibit 2 – Utility Layout

Appendix B: Preliminary Utility Plan

Appendix C: Wastewater Flow Analysis

Appendix D: Cavasson Master Wastewater Report

1.0 INTRODUCTION

Kimley-Horn and Associates, Inc. has prepared this wastewater basis of design report for the proposed Legacy North development at the northwest corner of Legacy Boulevard and Miller Road in Scottsdale, Arizona. This report intends to demonstrate that the proposed project conforms to the City of Scottsdale design requirements.

The Legacy North Development encompasses approximately 18.52 net acres and contains a various multi-family residential buildings totaling 443 dwelling units as well as 11,200 square feet of leasing and ammenity space. The project lies within a portion of the Northwest Quarter of Section 26, Township 4 North, Range 4 East of the Gila and Salt River Base and Meridian in Maricopa County, Arizona. More specifically, the site is bounded on the west by an APS substation, on the south by Legacy Boulevard, on the north by a condominium subdivision complex, and east by undeveloped commercial land. See **Appendix A** for the Vicinity Map.

2.0 WASTEWATER COLLECTION SYSTEM

2.1 INTENT AND SCOPE

The intent of this section is to evaluate the proposed sewer infrastructure and wastewater design flows for the development. As a result of this analysis, it will be determined if the sewer infrastructure is capable of supporting the proposed development in accordance with the City of Scottsdale Design Standards & Policies Manual (**Reference 1**) and the approved Cavasson Master Wastewater Report (**Reference 2**).

2.2 SEWER INFRASTRUCTURE

There is an existing 8-inch PVC sewer main that transitions to a 12-inch PVC sewer main located in Legacy Boulevard along the south side of the project and an existing 12-inch PVC sewer main stub located in Miller Road along the east side of the project. The sewer main in Legacy Road has 6 sewer stubs extending onto the project site. The existing sewer mains combine at an existing manhole at the intersection of Legacy Boulevard and Miller Road and flow southeast approximately 4,500 feet to a City of Scottsdale lift station.

An 8-inch PVC on-site private sewer main with 6-inch PVC sewer services will services will serve the proposed development. The Legacy North development will connect to two of the 8-inch PVC sewer main stubs in Legacy Boulevard and extend the sewer main through the site. Additionally, the existing sewer main in Miller Road will be extended along the site frontage with 8-inch PVC pipe. Two private sewer mains will connect to the proposed sewer main in Miller Road and extend through the site. Refer to **Appendix B** for the Preliminary Utility Plan.

2.3 WASTEWATER DESIGN FLOWS

The following calculations are based on information provided in Section 7-1.403 of the City of Scottsdale 2018 DSPM, **Reference 1**:

Average Day Sewer Flow:

High Density Condominium (Condo): 140 GPD/unit * (High Density Condominium

**Per Figure 7-1.2 Average Day Sewer Demand In Gallons Per Day & Peaking Factors By Land Use*

Legacy North (443 units proposed): (140 GPD/unit) x (443 units) = 62,020 GPD

62,020 GPD * Day / 24 hr * hr / 60 min = 43.07 GPM

Peak Sewer Flow:

High Density Condominium (Condo):

43.07 GPM * 4.5 = 193.82 GPM

Legacy North Flows:

Average Daily Flow = 43.07 GPM

Peak Flow = 193.82 GPM

Legacy North Flows (Master Report method):

80 gal/per * 1.7 per/DU * 21.56 DU/AC = 2,932.16 gal/AC

Average Daily Flow = 2,932.16 gal/AC * 20.56 AC = 60,285 GPD

Peak Day Demand = 60,285 GPD * 3.76 = 226,672 GPD

2.4 ANALYSIS

A wastewater model of the Master Development was performed in the Cavasson Master Wastewater report by Hubbard Engineering on February 12, 2019. According to the Master Sewer Loads Exhibit located in Appendix C of the Master Wastewater Report, the Legacy North parcel is located on Lot 3 which has an anticipated peak day demand of 268,282 GPD. When calculating the sewer demands for Legacy North development using the same methodology as the Cavasson Master Wastewater report, the peak daily demand is 226,672 GPD. The peak day demand for the Legacy North site is less than what was previously anticipated in the Cavasson Master Wastewater Report. Therefore, the master development wastewater infrastructure is sufficient to serve the proposed development. See **Appendix C** for the Cavasson Master Wastewater Report.

Sanitary sewer lines will be designed to maintain a maximum depth to diameter ratio (d/D) of 0.65 and minimum full flow velocity of 2.5 ft/sec in the ultimate peak flow condition using demands from the City of Scottsdale 2018 DSPM. Manning's Formula within Bentley's FlowMaster V8i software was utilized to verify the sewer capacity and flow velocity for the proposed sewer. The worst-case scenario was analyzed with the highest flow rate and smallest pipe diameter which occurs at Building J1 for a 6-inch sewer and when Building Y, Z, C1, D1, E1, J1, K1, N1, and O1 combine into an 8" sewer. Refer to **Appendix A** for Utility Layout. Refer to **Table 1** below and **Appendix B** for results.

Table 1 – Wastewater Analysis Results

Pipe Diameter D (inches)	Flow Scenario	Flow Rate (gpd)	Minimum Slope (%)	Flow Depth d (inches)	Flow Capacity (d/D)	Flow Velocity (ft/sec)
6	Average Flow	5,600	7.00	0.3	0.05	2.06
	Peak Flow	25,200	7.00	0.7	0.12	3.25
	Full Flow	725,726	7.00	3.9	0.65	8.31
8	Average Flow	27,550	1.00	1.0	0.13	1.63
	Peak Flow	120,450	1.00	2.1	0.26	2.07
	Full Flow	590,736	1.00	5.2	0.65	3.81

As seen from the results above and in **Appendix B**, the flow velocities and pipe capacities are within the acceptable design criteria.

3.0 CONCLUSION

This development proposes to connect the building sewer services to a private on-site sewer main that will discharge to an existing 8-inch PVC sewer main in Legacy Boulevard and a proposed 8-inch PVC sewer main in Miller Road. The existing 8-inch PVC sewer main and proposed 6-inch PVC private sewer services have adequate capacity for the flows generated by the proposed buildings. This development proposes to connect to the Cavasson Master Wastewater sewer main, which has adequate capacity to service the development.

4.0 REFERENCES

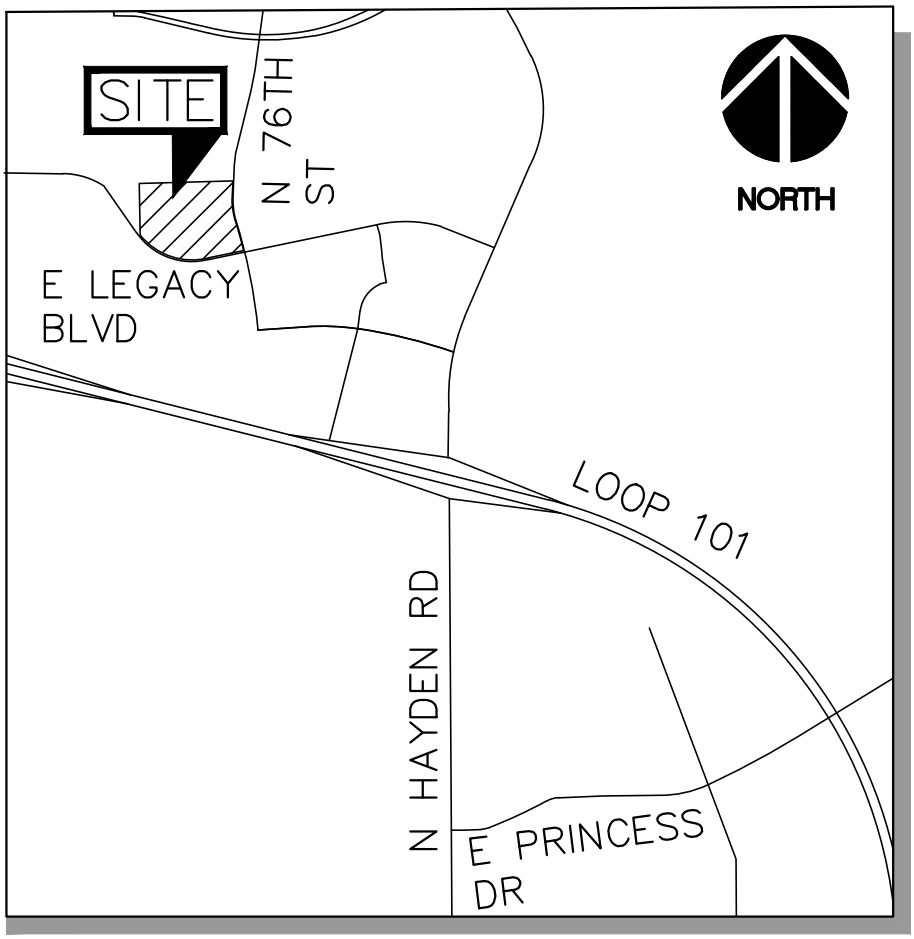
City of Scottsdale, *Design Standards and Policies Manual.* 2018.

Cavasson Master Wastewater Report, March 2019.

APPENDIX A: Exhibits

Exhibit 1 – Vicinity Map

Exhibit 2 – Utility Layout



VICINITY MAP

SCOTTSDALE, AZ

N.T.S.

VICINITY MAP

N.T.S.

NORTH

Kimley»Horn

K:\PHX_Civil\291878000 - Legacy & Miller\CADD\Exhibits\Vicinity Map.dwg Jun 22, 2023 Max.Halpert

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

LEGEND

- PROPERTY LINE
- RIGHT OF WAY LINE
- STREET CENTERLINE
- W — EXISTING WATER LINE
- S — EXISTING SANITARY SEWER MAIN
- W — PROPOSED WATER LINE
- S — PROPOSED SANITARY SEWER MAIN
- EXISTING SANITARY SEWER MANHOLE
- PROPOSED SANITARY SEWER MANHOLE
- CO — PROPOSED SANITARY SEWER CLEANOUT
- EXISTING FIRE HYDRANT
- PROPOSED FIRE DEPARTMENT CONNECTION
- PROPOSED FIRE HYDRANT

BUILDING A
BUILDING B
BUILDING C
BUILDING D
BUILDING E
BUILDING F
BUILDING G
BUILDING H
BUILDING I
BUILDING J
BUILDING K
BUILDING L
BUILDING M
BUILDING N
BUILDING O
BUILDING P
BUILDING Q
BUILDING R
BUILDING S
BUILDING T
BUILDING U
BUILDING V
BUILDING W
BUILDING X
BUILDING Y
BUILDING Z
BUILDING N1
BUILDING A1
BUILDING B1
BUILDING J1
BUILDING K1
BUILDING M1
BUILDING L1
BUILDING I1
BUILDING O1
BUILDING C1
BUILDING D1
BUILDING E1
BUILDING F1
BUILDING G1
BUILDING H1

PROPOSED 6" SEWER LINE
PROPOSED 8" WATER LINE
PROPOSED FIRE HYDRANT (TYP.)
PROPOSED 6" WATER LINE
PROPOSED 6" SEWER LINE
PROPOSED 8" SEWER LINE
PROPOSED 12" WATER LINE
20.0' WATER EASEMENT
DW
PROPOSED FIRE HYDRANT
EXISTING 8" SEWER LINE
EXISTING 20" WATER LINE
EXISTING 16" WATER LINE
EXISTING 12" SEWER LINE
E LEGACY BLVD
N MILLER RD

EXHIBIT 2: UTILITY LAYOUT

Kimley»Horn

K:\PHX_Civil\291878000 - Legacy & Miller\CADD\Exhibits\Utility Layout.dwg Jun 21, 2023 joseph.herrera-theut

Kimley»Horn

APPENDIX B: Preliminary Utility Plan

PUBLIC WATER MAIN NOTES

1. INSTALL 8" CLASS 350 DIP WATER MAIN POLYWRAPPED, LENGTH PER PLAN, MINIMUM 3' COVER. BEDDING AND BACKFILL PER COS STD DET 2201.
2. INSTALL 8"X6" TEE WITH RESTRAINED JOINTS PER MAG STD DET 303.
3. INSTALL 8" BEND WITH RESTRAINED JOINTS PER MAG STD DET 303, ANGLE PER PLAN.
4. INSTALL FIRE HYDRANT ASSEMBLY WITH VALVE PER MAG STD DET 360.
14. 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.
15. INSTALL 2" WATER SERVICE LINE CONNECTION WITH 2" METER PER COS STD DET 2330.

PRIVATE SEWER NOTES

1. INSTALL 8" SDR 35 PVC PRIVATE SEWER MAIN.
2. INSTALL 6" SDR 35 PVC PRIVATE SEWER SERVICE.
3. INSTALL 48" SEWER MANHOLE PER MAG STD DET 420-2, INVERTS PER PLAN.
4. CONNECT TO BUILDING SEWER AT TWO WAY CLEANOUT. REF MEP PLANS FOR CONTINUATION.
5. SEWER CLEANOUT PER MAG STD DET 441.
6. INSTALL WYE CONNECTION, INVERT PER PLAN.

PRIVATE FIRELINE NOTES

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

DOMESTIC WATER NOTES

1. BUILDING DOMESTIC WATER CONNECTION, REF MEP PLANS FOR CONTINUATION.
2. INSTALL 3" SCH 40 PVC DOMESTIC WATER SERVICE.
3. INSTALL 2.5" DOUBLE CHECK VALVE BACKFLOW PREVENTION ASSEMBLY PER COS STD DET 2352.

CIVIL ENGINEER
KIMLEY-HORN AND ASSOCIATES, INC.
7740 N. 16TH STREET
SUITE 300
PHOENIX, AZ 85020
PH: (602) 944-5500
CONTACT: GARRETT FRAME, PE

DEVELOPER/OWNER
THE DINERSTEIN COMPANY
1010 S. COAST HIGHWAY 101, STE 106
ENCINITAS, CA 92024

LAND SURVEYOR
SURVEY INNOVATION GROUP, INC
22425 N. 16TH STREET, SUITE 1
PHOENIX, ARIZONA 85024
PH: (480) 922-0780
CONTACT: MICHAEL A. BANTA, RLS

ARCHITECT
KTGY ARCHITECTURE + PLANNING
17911 VON KARMAN AVE, STE 200
IRVINE, CA 92614
PH: (949) 851-2133

FLOOD INFORMATION
ACCORDING TO THE FLOOD INSURANCE RATE MAP #04013C1320 L, DATED 10/16/2013, THIS PROPERTY IS LOCATED IN FLOOD ZONE "AO" IS DEFINED AS AREAS WITH BASE FLOOD ELEVATION OR DEPT. (DEPTH 1 FEET)(VEL 3 FEET/SECOND)

NOTES
1. ADD 1500' TO ALL ELEVATIONS.
2. ALL ELEVATIONS ARE INVERT ELEVATIONS, UNLESS OTHERWISE NOTED.
3. SEE HEREON FOR LEGEND.
4. ALL PIPE CROSSING INFORMATION IS PRELIMINARY AND SUBJECT TO CHANGE DURING FINAL DESIGN.

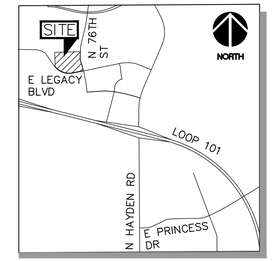
BENCHMARK
PER SURVEY INNOVATION GROUP, THE BENCHMARK IS: FOUND 2 1/2" STEEL PIPE 0.15' UP WITH 3 1/4" BLM BRASS CAP STAMPED "T4N R4E 1/4 S26 S35 1995"

ELEVATION = 1598.718 (NAD83)

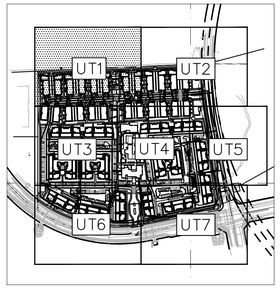
BASIS OF BEARING
PER SURVEY INNOVATION GROUP, THE BASIS OF BEARING IS THE SOUTH LINE OF THE SOUTHEAST QUARTER OF SECTION 26, TOWNSHIP 4 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, AS SHOWN IN BOOK 693, PAGE 3 MARICOPA COUNTY RECORDS.

SAID LINE BEARS SOUTH 89 DEGREES 58 MINUTES 20 SECONDS EAST.

LEGEND
- PROPERTY LINE
- RIGHT OF WAY LINE
- STREET CENTERLINE
- EASEMENT LINE
- EXISTING SANITARY SEWER MAIN
- EXISTING PUBLIC WATER MAIN
- EXISTING CABLE TV LINE
- EXISTING ELECTRIC LINE
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- PROPOSED WATER MAIN
- PROPOSED SEWER MAIN
- PROPOSED FIRE LINE
- PROPOSED DOMESTIC WATER LINE
- EXISTING FIRE HYDRANT
- PROPOSED FIRE HYDRANT
- PROPOSED FIRE DEPARTMENT CONNECTION
- PROPOSED CATCH BASIN
- EXISTING SANITARY SEWER MANHOLE
- PROPOSED SANITARY SEWER MANHOLE



VICINITY MAP
SCOTTSDALE, AZ
N.T.S.

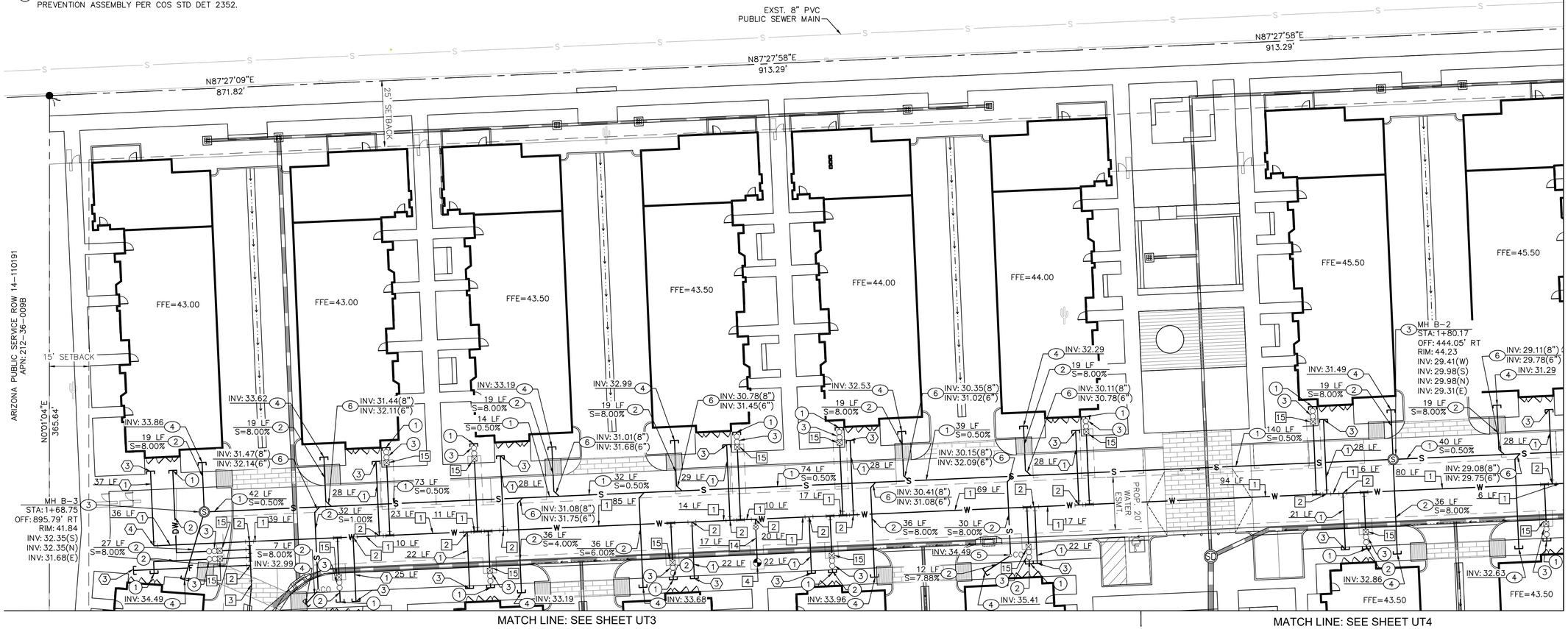


KEY MAP
N.T.S.

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

APN 212-43-601
VILLAGE AT GREYHAWK OWNERS ASSOCIATION
DOCUMENT NO. 2011-0525654 M.C.R.
ZONING: R-5



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7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

NWC LEGACY BLVD AND MILLER ROAD

PRELIMINARY UTILITY PLAN

SCOTTSDALE, ARIZONA

PROJECT No.	291878000
SCALE (H):	1"=20'
SCALE (V):	NONE
DRAWN BY:	HDO
DESIGN BY:	RMH
CHECK BY:	CGF
DATE:	06/23/23

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64329
C. GARRETT FRAME
Date Signed 06/23/23
ARIZONA, U.S.A.
Expires 06/30/25

878000Pre-UT.dwg

UT1
1 OF 7 SHEETS

APPR. | DATE | BY | DESCRIPTION | REV

PUBLIC WATER MAIN NOTES

1. INSTALL 8" CLASS 350 DIP WATER MAIN POLYWRAPPED, LENGTH PER PLAN, MINIMUM 3' COVER. BEDDING AND BACKFILL PER COS STD DET 2201.
2. INSTALL 8"X6" TEE WITH RESTRAINED JOINTS PER MAG STD DET 303.
3. INSTALL 8" BEND WITH RESTRAINED JOINTS PER MAG STD DET 303, ANGLE PER PLAN.
4. INSTALL FIRE HYDRANT ASSEMBLY WITH VALVE PER MAG STD DET 360.
9. CONNECT TO EXISTING 12" WATER MAIN WITH 12" BEND.
13. 12"X8" TEE WITH RESTRAINED JOINTS PER MAG STD DET 303.
14. 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.
15. INSTALL 2" WATER SERVICE LINE CONNECTION WITH 2" METER PER COS STD DET 2330.
18. INSTALL 12" CLASS 350 DIP WATER MAIN POLYWRAPPED WITH TRACER WIRE, LENGTH PER PLAN. 3' MINIMUM COVER.

PRIVATE SEWER NOTES

1. INSTALL 8" SDR 35 PVC PRIVATE SEWER MAIN.
2. INSTALL 6" SDR 35 PVC PRIVATE SEWER SERVICE.
3. INSTALL 48" SEWER MANHOLE PER MAG STD DET 420-2, INVERTS PER PLAN.
4. CONNECT TO BUILDING SEWER AT TWO WAY CLEANOUT. REF MEP PLANS FOR CONTINUATION.
6. INSTALL WYE CONNECTION, INVERT PER PLAN.

PUBLIC SEWER NOTES

3. INSTALL 48" SEWER MANHOLE PER MAG STD DET 420-2, INVERTS PER PLAN.

DOMESTIC WATER NOTES

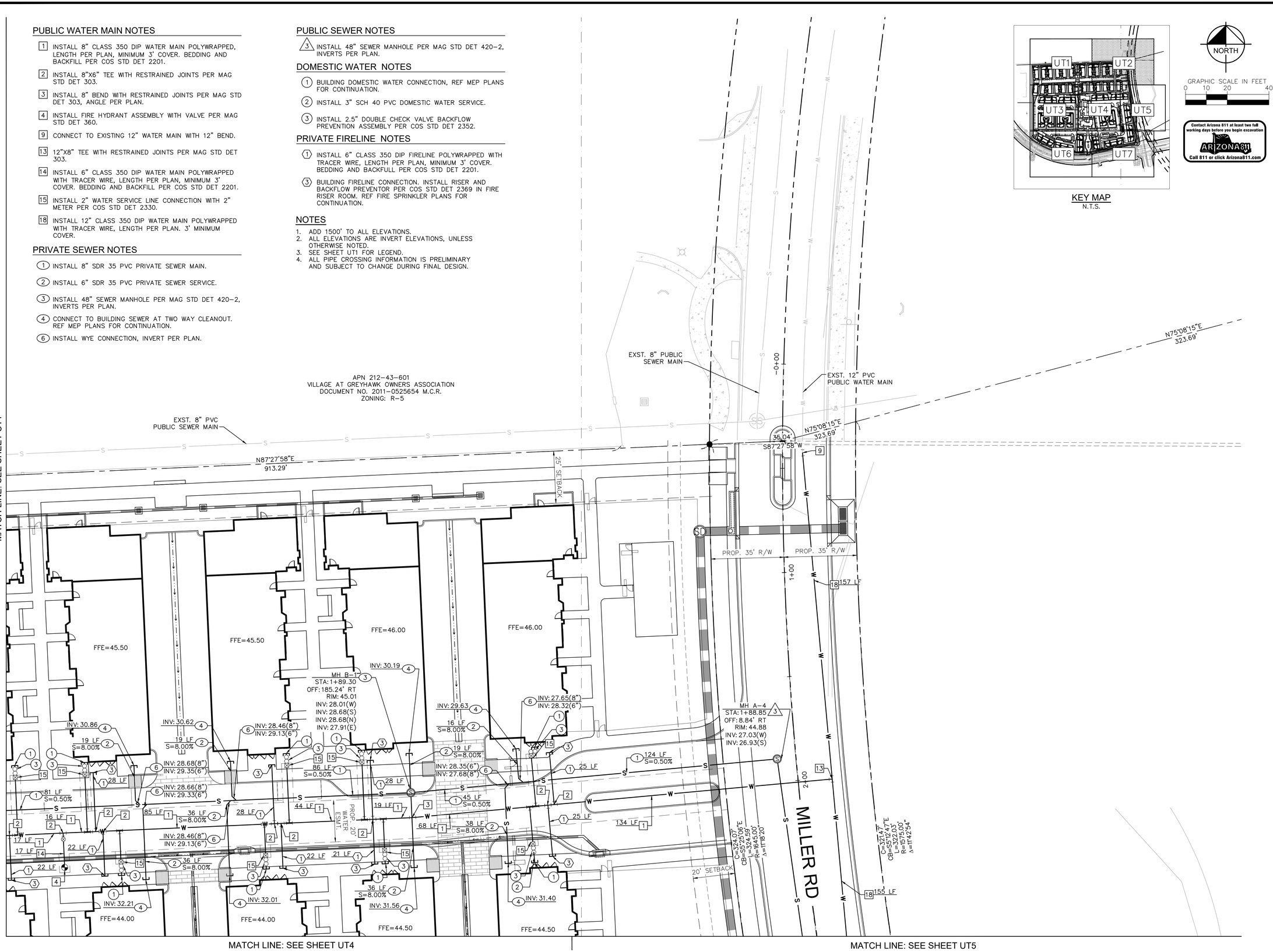
1. BUILDING DOMESTIC WATER CONNECTION, REF MEP PLANS FOR CONTINUATION.
2. INSTALL 3" SCH 40 PVC DOMESTIC WATER SERVICE.
3. INSTALL 2.5" DOUBLE CHECK VALVE BACKFLOW PREVENTION ASSEMBLY PER COS STD DET 2352.

PRIVATE FIRELINE NOTES

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3. BUILDING FIRELINE CONNECTION. INSTALL RISER AND BACKFLOW PREVENTOR PER COS STD DET 2369 IN FIRE RISER ROOM. REF FIRE SPRINKLER PLANS FOR CONTINUATION.

NOTES

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3. SEE SHEET UT1 FOR LEGEND.
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KEY MAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

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ARIZONA811
Call 811 or click Arizona811.com

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7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

NWC LEGACY BLVD AND MILLER ROAD

PRELIMINARY UTILITY PLAN

SCOTTSDALE, ARIZONA

PROJECT No.	291878000
SCALE (H):	1"=20'
SCALE (V):	NONE
DRAWN BY:	HDO
DESIGN BY:	RMH
CHECK BY:	CGF
DATE:	06/23/23

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CERTIFICATE NO.
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Expires 06/30/25

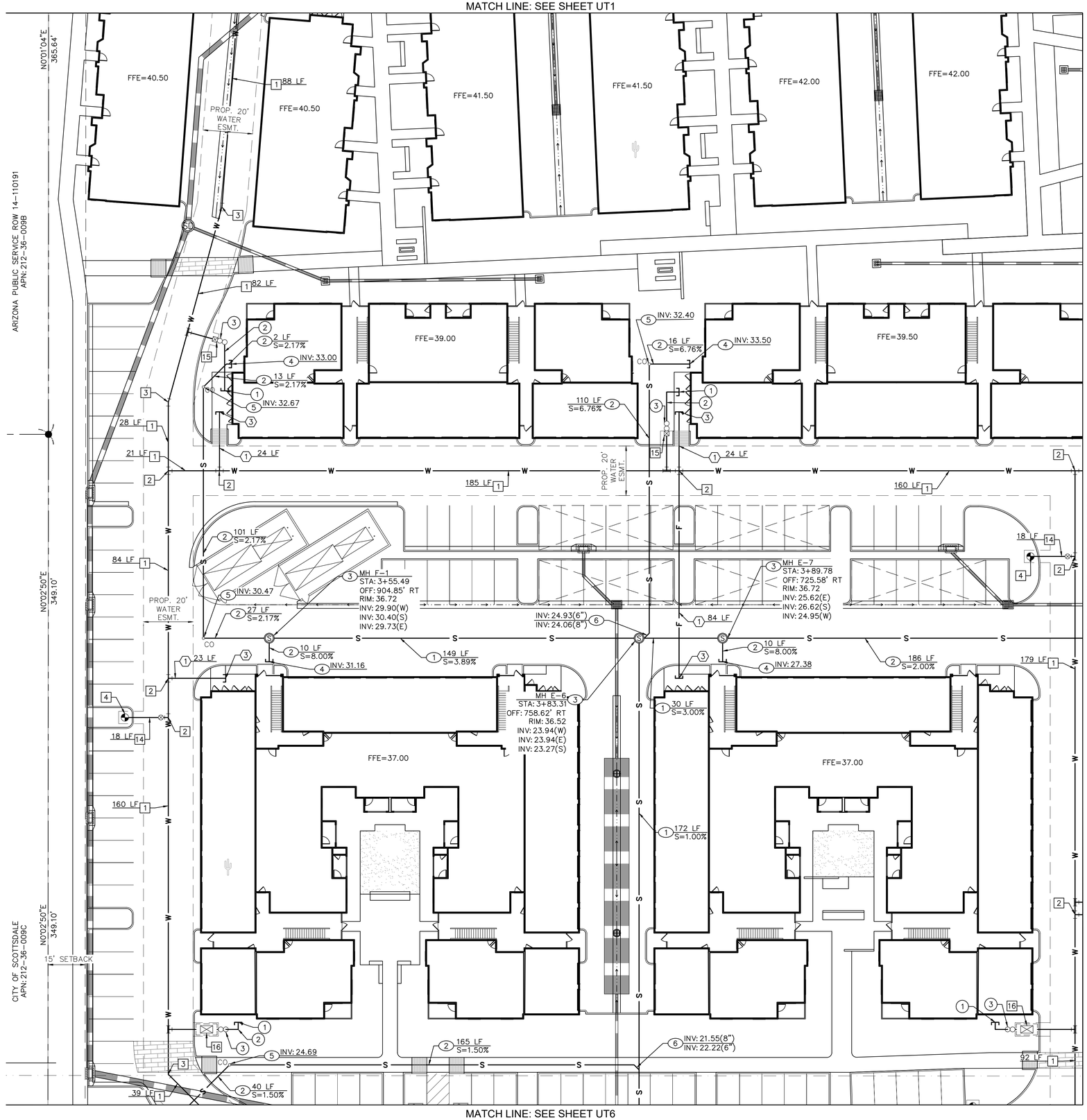
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UT2

2 OF **7** SHEETS

REV	DESCRIPTION	BY	DATE	APPR.

MATCH LINE: SEE SHEET UT1



PUBLIC WATER MAIN NOTES

1. INSTALL 8" CLASS 350 DIP WATER MAIN POLYWRAPPED, LENGTH PER PLAN, MINIMUM 3' COVER. BEDDING AND BACKFILL PER COS STD DET 2201.
2. INSTALL 8"X6" TEE WITH RESTRAINED JOINTS PER MAG STD DET 303.
3. INSTALL 8" BEND WITH RESTRAINED JOINTS PER MAG STD DET 303, ANGLE PER PLAN.
4. INSTALL FIRE HYDRANT ASSEMBLY WITH VALVE PER MAG STD DET 360.
14. 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.
15. INSTALL 2" WATER SERVICE LINE CONNECTION WITH 2" METER PER COS STD DET 2330.
16. INSTALL 3" WATER SERVICE LINE CONNECTION WITH 3" METER PER COS STD DET 2345-1.

PRIVATE SEWER NOTES

1. INSTALL 8" SDR 35 PVC PRIVATE SEWER MAIN.
2. INSTALL 6" SDR 35 PVC PRIVATE SEWER SERVICE.
3. INSTALL 48" SEWER MANHOLE PER MAG STD DET 420-2, INVERTS PER PLAN.
4. CONNECT TO BUILDING SEWER AT TWO WAY CLEANOUT. REF MEP PLANS FOR CONTINUATION.
5. SEWER CLEANOUT PER MAG STD DET 441.
6. INSTALL WYE CONNECTION, INVERT PER PLAN.

PRIVATE FIRELINE NOTES

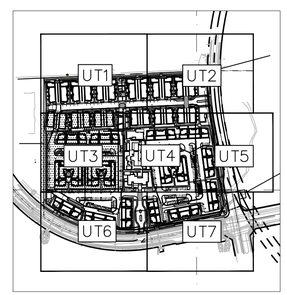
1. INSTALL 6" CLASS 350 DIP FIRELINE POLYWRAPPED WITH TRACER WIRE, LENGTH PER PLAN, MINIMUM 3' COVER. BEDDING AND BACKFULL PER COS STD DET 2201.
3. BUILDING FIRELINE CONNECTION. INSTALL RISER AND BACKFLOW PREVENTOR PER COS STD DET 2369 IN FIRE RISER ROOM. REF FIRE SPRINKLER PLANS FOR CONTINUATION.

DOMESTIC WATER NOTES

1. BUILDING DOMESTIC WATER CONNECTION, REF MEP PLANS FOR CONTINUATION.
2. INSTALL 3" SCH 40 PVC DOMESTIC WATER SERVICE.
3. INSTALL 2.5" DOUBLE CHECK VALVE BACKFLOW PREVENTION ASSEMBLY PER COS STD DET 2352.

NOTES

1. ADD 1500' TO ALL ELEVATIONS.
2. ALL ELEVATIONS ARE INVERT ELEVATIONS, UNLESS OTHERWISE NOTED.
3. SEE SHEET UT1 FOR LEGEND.
4. ALL PIPE CROSSING INFORMATION IS PRELIMINARY AND SUBJECT TO CHANGE DURING FINAL DESIGN.



KEY MAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

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NWC LEGACY BLVD AND MILLER ROAD

PRELIMINARY UTILITY PLAN

SCOTTSDALE, ARIZONA

PROJECT No.	291878000
SCALE (H):	1"=20'
SCALE (V):	NONE
DRAWN BY:	HDO
DESIGN BY:	RMH
CHECK BY:	CGF
DATE:	06/23/23

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64329
C. GARRETT FRAME
Date Signed 06/23/23
ARIZONA, USA
Expires 09/30/24

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UT3
3 OF 7 SHEETS

MATCH LINE: SEE SHEET 1

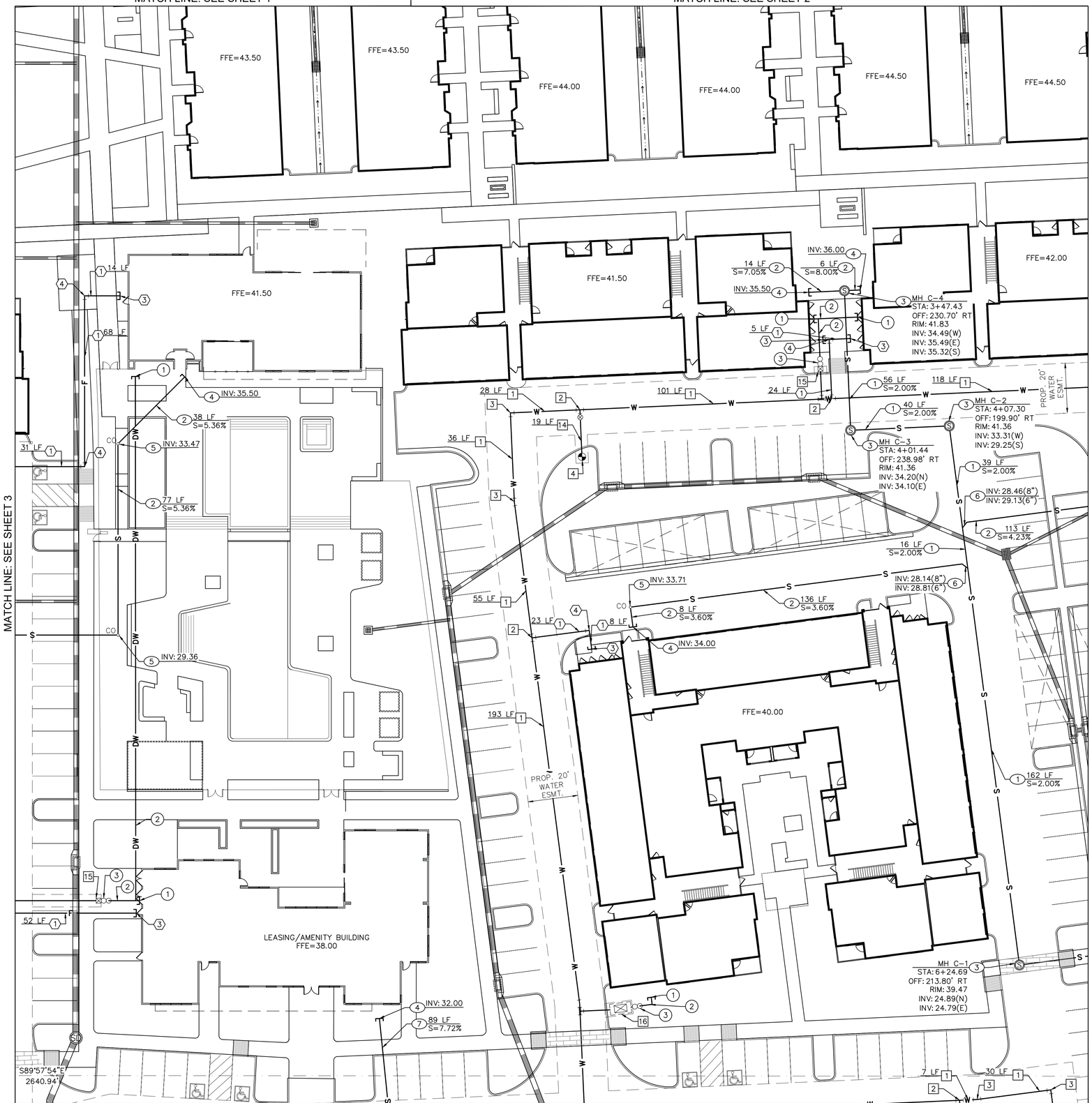
MATCH LINE: SEE SHEET 2

MATCH LINE: SEE SHEET 3

MATCH LINE: SEE SHEET UT5

MATCH LINE: SEE SHEET UT6

MATCH LINE: SEE SHEET UT7



PUBLIC WATER MAIN NOTES

1. INSTALL 8" CLASS 350 DIP WATER MAIN POLYWRAPPED, LENGTH PER PLAN, MINIMUM 3' COVER. BEDDING AND BACKFILL PER COS STD DET 2201.
2. INSTALL 8"X6" TEE WITH RESTRAINED JOINTS PER MAG STD DET 303.
3. INSTALL 8" BEND WITH RESTRAINED JOINTS PER MAG STD DET 303, ANGLE PER PLAN.
4. INSTALL FIRE HYDRANT ASSEMBLY WITH VALVE PER MAG STD DET 360.
14. 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.
15. INSTALL 2" WATER SERVICE LINE CONNECTION WITH 2" METER PER COS STD DET 2330.
16. INSTALL 3" WATER SERVICE LINE CONNECTION WITH 3" METER PER COS STD DET 2345-1.

PRIVATE SEWER NOTES

1. INSTALL 8" SDR 35 PVC PRIVATE SEWER MAIN.
2. INSTALL 6" SDR 35 PVC PRIVATE SEWER SERVICE.
3. INSTALL 48" SEWER MANHOLE PER MAG STD DET 420-2, INVERTS PER PLAN.
4. CONNECT TO BUILDING SEWER AT TWO WAY CLEANOUT. REF MEP PLANS FOR CONTINUATION.
5. SEWER CLEANOUT PER MAG STD DET 441.
6. INSTALL WYE CONNECTION, INVERT PER PLAN.
7. PROPOSED 4" SDR 35 PVC PRIVATE SEWER SERVICE.

PRIVATE FIRELINE NOTES

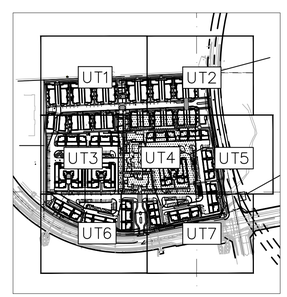
1. INSTALL 6" CLASS 350 DIP FIRELINE POLYWRAPPED WITH TRACER WIRE, LENGTH PER PLAN, MINIMUM 3' COVER. BEDDING AND BACKFULL PER COS STD DET 2201.
3. BUILDING FIRELINE CONNECTION. INSTALL RISER AND BACKFLOW PREVENTOR PER COS STD DET 2369 IN FIRE RISER ROOM. REF FIRE SPRINKLER PLANS FOR CONTINUATION.
4.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

DOMESTIC WATER NOTES

1. BUILDING DOMESTIC WATER CONNECTION, REF MEP PLANS FOR CONTINUATION.
2. INSTALL 3" SCH 40 PVC DOMESTIC WATER SERVICE.
3. INSTALL 2.5" DOUBLE CHECK VALVE BACKFLOW PREVENTION ASSEMBLY PER COS STD DET 2352.

NOTES

1. ADD 1500' TO ALL ELEVATIONS.
2. ALL ELEVATIONS ARE INVERT ELEVATIONS, UNLESS OTHERWISE NOTED.
3. SEE SHEET UT1 FOR LEGEND.
4. ALL PIPE CROSSING INFORMATION IS PRELIMINARY AND SUBJECT TO CHANGE DURING FINAL DESIGN.



KEY MAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

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NWC LEGACY BLVD AND MILLER ROAD

PRELIMINARY UTILITY PLAN

SCOTTSDALE, ARIZONA

PROJECT No.
291878000

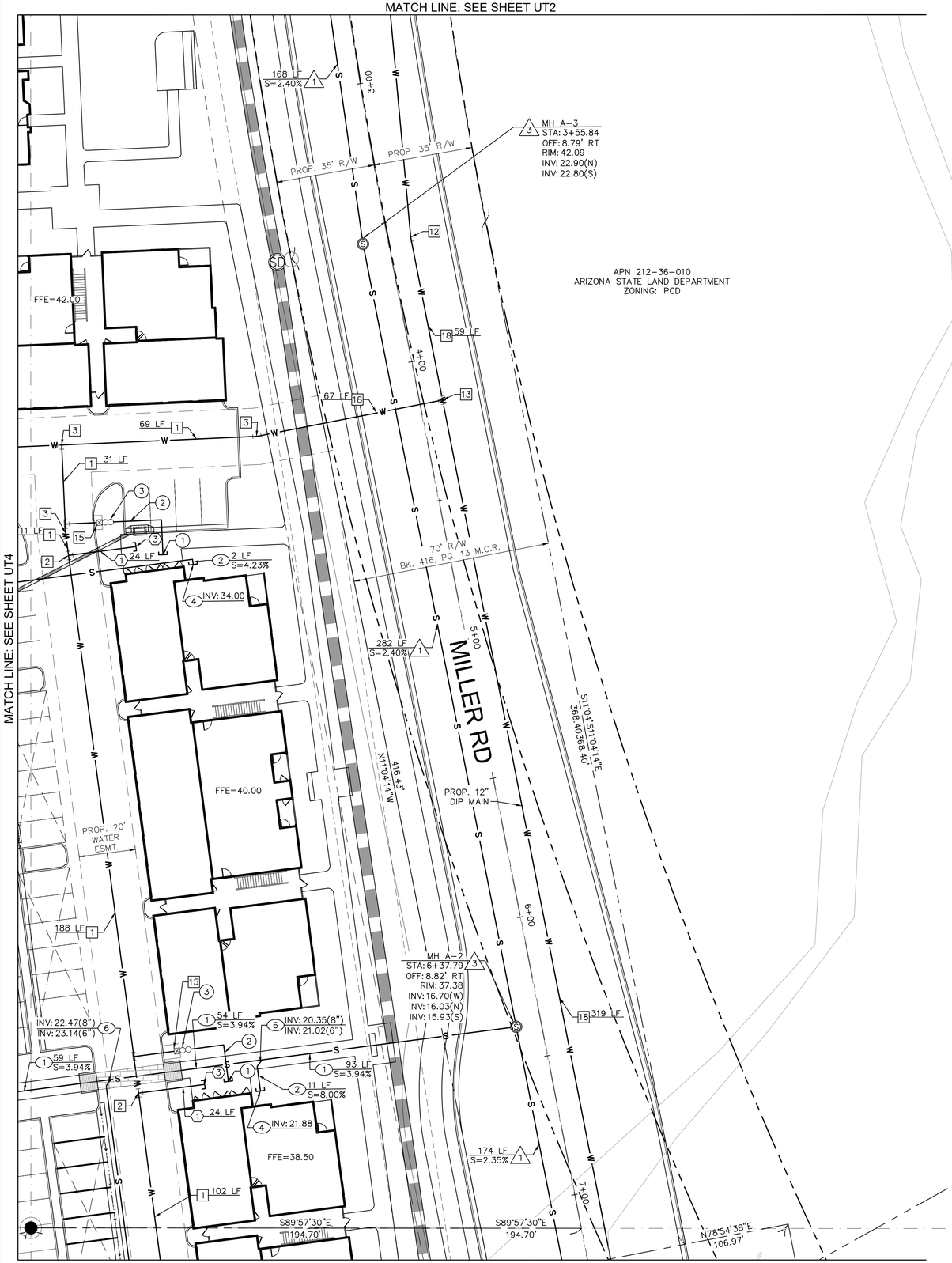
SCALE (H):	1"=20'
SCALE (V):	NONE
DRAWN BY:	HDO
DESIGN BY:	RMH
CHECK BY:	CGF
DATE:	06/23/23

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64329
C. GARRETT FRAME
Date Signed 06/23/23
ARIZONA, USA
Expires 06/30/24

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UT4
4 OF 7 SHEETS

MATCH LINE: SEE SHEET UT2



MATCH LINE: SEE SHEET UT4

MATCH LINE: SEE SHEET UT7

PUBLIC WATER MAIN NOTES

1. INSTALL 8" CLASS 350 DIP WATER MAIN POLYWRAPPED, LENGTH PER PLAN, MINIMUM 3' COVER. BEDDING AND BACKFILL PER COS STD DET 2201.
2. INSTALL 8"X6" TEE WITH RESTRAINED JOINTS PER MAG STD DET 303.
3. INSTALL 8" BEND WITH RESTRAINED JOINTS PER MAG STD DET 303, ANGLE PER PLAN.
12. 12" BEND WITH THRUST BLOCKS PER MAG STD DET 380, ANGLE PER PLAN.
13. 12"X8" TEE WITH RESTRAINED JOINTS PER MAG STD DET 303.
15. INSTALL 2" WATER SERVICE LINE CONNECTION WITH 2" METER PER COS STD DET 2330.
18. INSTALL 12" CLASS 350 DIP WATER MAIN POLYWRAPPED WITH TRACER WIRE, LENGTH PER PLAN. 3' MINIMUM COVER.

PRIVATE SEWER NOTES

(1) INSTALL 8" SDR 35 PVC PRIVATE SEWER MAIN.

(2) INSTALL 6" SDR 35 PVC PRIVATE SEWER SERVICE.

(4) CONNECT TO BUILDING SEWER AT TWO WAY CLEANOUT. REF MEP PLANS FOR CONTINUATION.

(6) INSTALL WYE CONNECTION, INVERT PER PLAN.

PRIVATE FIRELINE NOTES

⟨1⟩ INSTALL 6" CLASS 350 DIP FIRELINE POLYWRAPPED WITH TRACER WIRE, LENGTH PER PLAN, MINIMUM 3' COVER. BEDDING AND BACKFULL PER COS STD DET 2201.

⟨3⟩ BUILDING FIRELINE CONNECTION. INSTALL RISER AND BACKFLOW PREVENTOR PER COS STD DET 2369 IN FIRE RISER ROOM. REF FIRE SPRINKLER PLANS FOR CONTINUATION.

DOMESTIC WATER NOTES

(1) BUILDING DOMESTIC WATER CONNECTION, REF MEP PLANS FOR CONTINUATION.

(2) INSTALL 3" SCH 40 PVC DOMESTIC WATER SERVICE.

(3) INSTALL 2.5" DOUBLE CHECK VALVE BACKFLOW PREVENTION ASSEMBLY PER COS STD DET 2352.

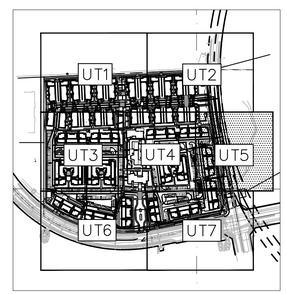
PUBLIC SEWER NOTES

△1 INSTALL 8" SDR 35 PVC PUBLIC SEWER MAIN.

△3 INSTALL 48" SEWER MANHOLE PER MAG STD DET 420-2, INVERTS PER PLAN.

NOTES

1. ADD 1500' TO ALL ELEVATIONS.
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3. SEE SHEET UT1 FOR LEGEND.
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KEY MAP
N.T.S.

NORTH

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NWC LEGACY BLVD AND MILLER ROAD

PRELIMINARY UTILITY PLAN

SCOTTSDALE, ARIZONA

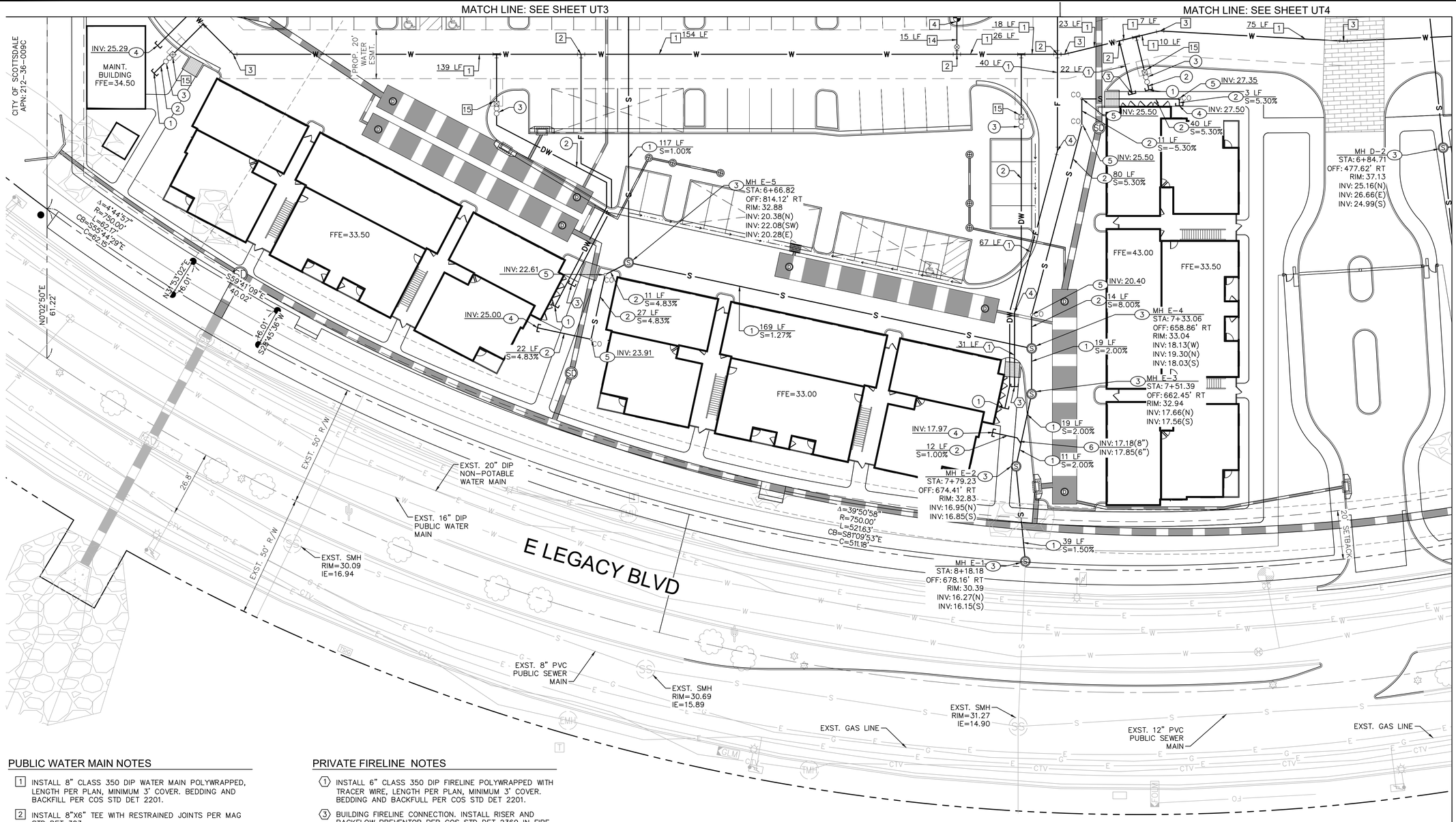
PROJECT No.
291878000

SCALE (H):	1"=20'
SCALE (V):	NONE
DRAWN BY:	HDO
DESIGN BY:	RMH
CHECK BY:	CGF
DATE:	06/23/23

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64329
C. GARRETT FRAME
Date Signed 06/23/23
ARIZONA, U.S.A.
Expires 06/30/25

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UT5
5 OF 7 SHEETS



PUBLIC WATER MAIN NOTES

1. INSTALL 8" CLASS 350 DIP WATER MAIN POLYWRAPPED, LENGTH PER PLAN, MINIMUM 3' COVER. BEDDING AND BACKFILL PER COS STD DET 2201.
2. INSTALL 8"X6" TEE WITH RESTRAINED JOINTS PER MAG STD DET 303.
3. INSTALL 8" BEND WITH RESTRAINED JOINTS PER MAG STD DET 303, ANGLE PER PLAN.
4. INSTALL FIRE HYDRANT ASSEMBLY WITH VALVE PER MAG STD DET 360.
14. 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.
15. INSTALL 2" WATER SERVICE LINE CONNECTION WITH 2" METER PER COS STD DET 2330.

PRIVATE SEWER NOTES

1. INSTALL 8" SDR 35 PVC PRIVATE SEWER MAIN.
2. INSTALL 6" SDR 35 PVC PRIVATE SEWER SERVICE.
3. INSTALL 48" SEWER MANHOLE PER MAG STD DET 420-2, INVERTS PER PLAN.
4. CONNECT TO BUILDING SEWER AT TWO WAY CLEANOUT. REF MEP PLANS FOR CONTINUATION.
5. SEWER CLEANOUT PER MAG STD DET 441.
6. INSTALL WYE CONNECTION, INVERT PER PLAN.

PRIVATE FIRELINE NOTES

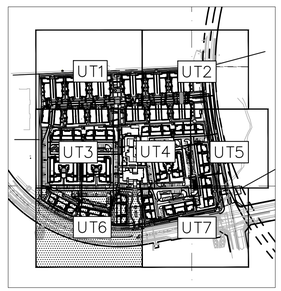
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3. BUILDING FIRELINE CONNECTION. INSTALL RISER AND BACKFLOW PREVENTOR PER COS STD DET 2369 IN FIRE RISER ROOM. REF FIRE SPRINKLER PLANS FOR CONTINUATION.
4. INSTALL 6" BEND WITH RESTRAINED JOINTS PER MAG STD DET 303, ANGLE PER PLAN.

DOMESTIC WATER NOTES

1. BUILDING DOMESTIC WATER CONNECTION, REF MEP PLANS FOR CONTINUATION.
2. INSTALL 3" SCH 40 PVC DOMESTIC WATER SERVICE.
3. INSTALL 2.5" DOUBLE CHECK VALVE BACKFLOW PREVENTION ASSEMBLY PER COS STD DET 2352.

NOTES

1. ADD 1500' TO ALL ELEVATIONS.
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3. SEE SHEET UT1 FOR LEGEND.
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KEY MAP
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GRAPHIC SCALE IN FEET
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NWC LEGACY BLVD AND MILLER ROAD SCOTTSDALE, ARIZONA

PRELIMINARY UTILITY PLAN

PROJECT No.	291878000
SCALE (H):	1"=20'
SCALE (V):	NONE
DRAWN BY:	HDO
DESIGN BY:	RMH
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DATE:	06/23/23

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64329
C. GARRETT FRAME
Date Signed 06/23/23
ARIZONA, U.S.A.
Expires 06/30/25

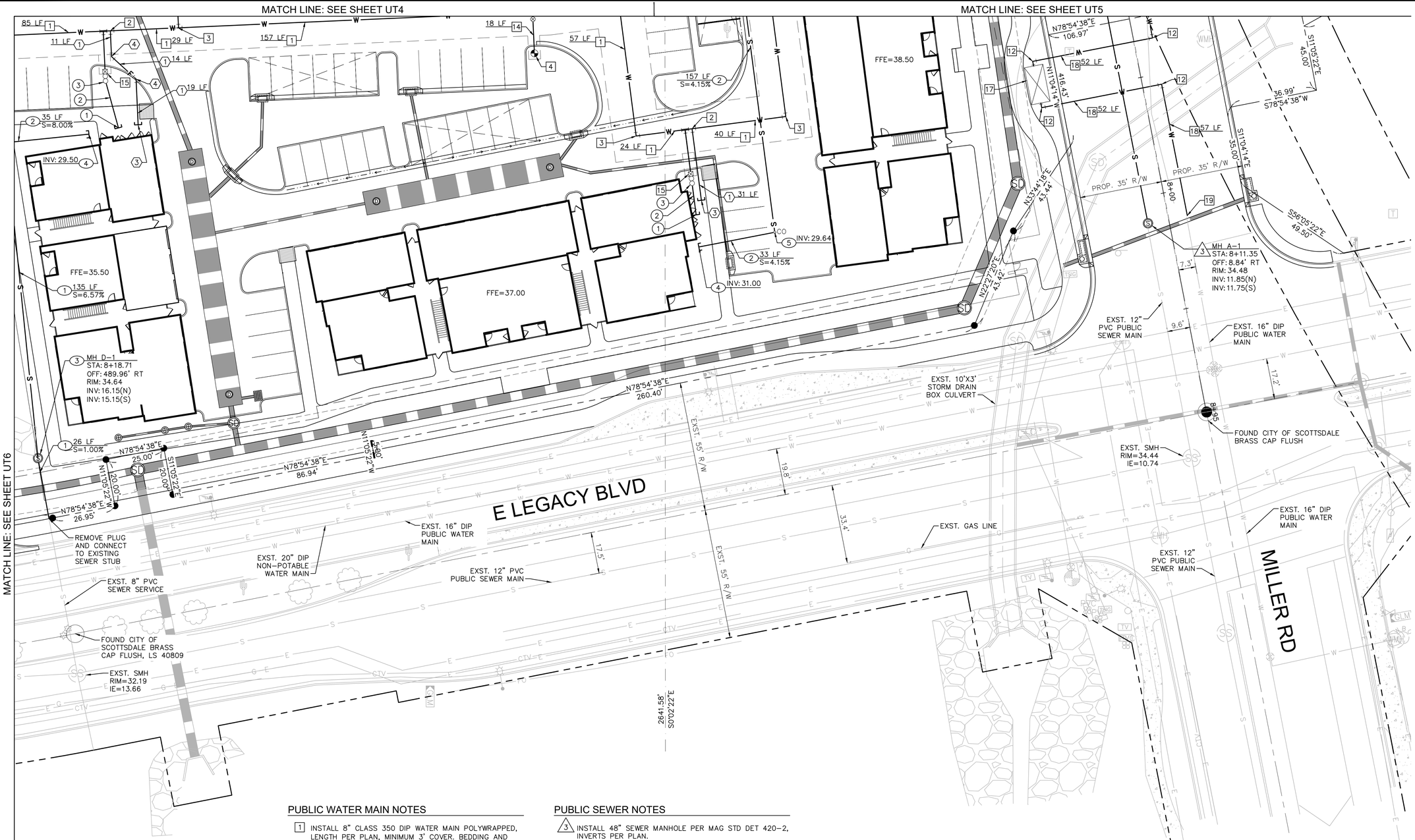
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UT6
6 OF 7 SHEETS

MATCH LINE: SEE SHEET UT4

MATCH LINE: SEE SHEET UT5

MATCH LINE: SEE SHEET UT6



PRIVATE SEWER NOTES

(1) INSTALL 8" SDR 35 PVC PRIVATE SEWER MAIN.

(2) INSTALL 6" SDR 35 PVC PRIVATE SEWER SERVICE.

(3) INSTALL 48" SEWER MANHOLE PER MAG STD DET 420-2, INVERTS PER PLAN.

(4) CONNECT TO BUILDING SEWER AT TWO WAY CLEANOUT. REF MEP PLANS FOR CONTINUATION.

(5) SEWER CLEANOUT PER MAG STD DET 441.

PRIVATE FIRELINE NOTES

(1) INSTALL 6" CLASS 350 DIP FIRELINE POLYWRAPPED WITH TRACER WIRE, LENGTH PER PLAN, MINIMUM 3' COVER. BEDDING AND BACKFULL PER COS STD DET 2201.

(3) BUILDING FIRELINE CONNECTION. INSTALL RISER AND BACKFLOW PREVENTOR PER COS STD DET 2369 IN FIRE RISER ROOM. REF FIRE SPRINKLER PLANS FOR CONTINUATION.

(4) INSTALL 6" BEND WITH RESTRAINED JOINTS PER MAG STD DET 303, ANGLE PER PLAN.

PUBLIC WATER MAIN NOTES

[1] INSTALL 8" CLASS 350 DIP WATER MAIN POLYWRAPPED, LENGTH PER PLAN, MINIMUM 3' COVER. BEDDING AND BACKFILL PER COS STD DET 2201.

[2] INSTALL 8"X6" TEE WITH RESTRAINED JOINTS PER MAG STD DET 303.

[3] INSTALL 8" BEND WITH RESTRAINED JOINTS PER MAG STD DET 303, ANGLE PER PLAN.

[4] INSTALL FIRE HYDRANT ASSEMBLY WITH VALVE PER MAG STD DET 360.

[12] 12" BEND WITH THRUST BLOCKS PER MAG STD DET 380, ANGLE PER PLAN.

[14] 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.

[15] INSTALL 2" WATER SERVICE LINE CONNECTION WITH 2" METER PER COS STD DET 2330.

[17] PROPOSED PRESSURE REDUCING VALVE PER COS STD DETAIL 2342-1.

[18] INSTALL 12" CLASS 350 DIP WATER MAIN POLYWRAPPED WITH TRACER WIRE, LENGTH PER PLAN. 3' MINIMUM COVER.

[19] CONNECT TO EXISTING WATER MAIN WITH 16"X12" REDUCER WITH THRUST BLOCKS PER MAG STD DET 380.

PUBLIC SEWER NOTES

(3) INSTALL 48" SEWER MANHOLE PER MAG STD DET 420-2, INVERTS PER PLAN.

DOMESTIC WATER NOTES

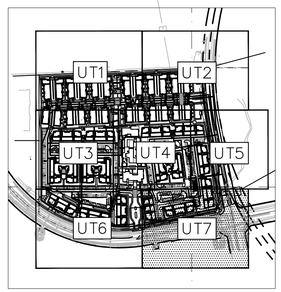
(1) BUILDING DOMESTIC WATER CONNECTION, REF MEP PLANS FOR CONTINUATION.

(2) INSTALL 3" SCH 40 PVC DOMESTIC WATER SERVICE.

(3) INSTALL 2.5" DOUBLE CHECK VALVE BACKFLOW PREVENTION ASSEMBLY PER COS STD DET 2352.

NOTES

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3. SEE SHEET UT1 FOR LEGEND.
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KEY MAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

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REV	DESCRIPTION	BY	DATE	APPR.

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NWC LEGACY BLVD AND MILLER ROAD

PRELIMINARY UTILITY PLAN

SCOTTSDALE, ARIZONA

PROJECT No.	291878000
SCALE (H):	1"=20'
SCALE (V):	NONE
DRAWN BY:	HDO
DESIGN BY:	RMH
CHECK BY:	CGF
DATE:	06/23/23

Registered Professional Engineer
CERTIFICATE NO.
64329
C. GARRETT FRAME
Date Signed 06/23/23
ARIZONA, USA
Expires 06/30/24

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UT7
7 OF 7 SHEETS

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APPENDIX C: Wastewater Flow Analysis

Worksheet for 6" Sewer - ADF

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	7.000	%
Diameter	6.0	in
Discharge	5,600.00	gpd

Results		
Normal Depth	0.3	in
Flow Area	0.0	ft²
Wetted Perimeter	0.2	ft
Hydraulic Radius	0.2	in
Top Width	0.23	ft
Critical Depth	0.5	in
Percent Full	5.5	%
Critical Slope	0.842	%
Velocity	2.06	ft/s
Velocity Head	0.07	ft
Specific Energy	0.09	ft
Froude Number	2.663	
Maximum Discharge	1,032,071.38	gpd
Discharge Full	959,436.41	gpd
Slope Full	0.000	%
Flow Type	Supercritical	

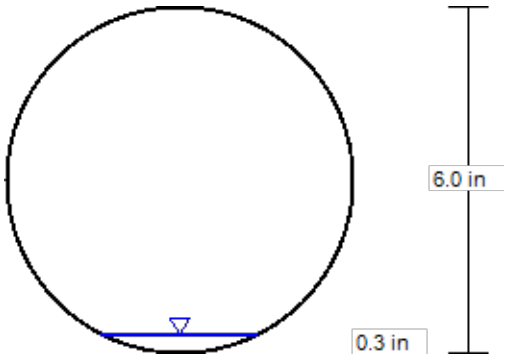
GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

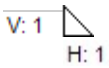
GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	5.5	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.3	in
Critical Depth	0.5	in
Channel Slope	7.000	%
Critical Slope	0.842	%

Cross Section for 6" Sewer - ADF

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	7.000 %
Normal Depth	0.3 in
Diameter	6.0 in
Discharge	5,600.00 gpd





Worksheet for 6" Sewer - PDF

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	7.000	%
Diameter	6.0	in
Discharge	25,200.00	gpd

Results		
Normal Depth	0.7	in
Flow Area	0.0	ft²
Wetted Perimeter	0.3	ft
Hydraulic Radius	0.4	in
Top Width	0.31	ft
Critical Depth	1.2	in
Percent Full	11.2	%
Critical Slope	0.734	%
Velocity	3.25	ft/s
Velocity Head	0.16	ft
Specific Energy	0.22	ft
Froude Number	2.932	
Maximum Discharge	1,032,071.38	gpd
Discharge Full	959,436.41	gpd
Slope Full	0.005	%
Flow Type	Supercritical	

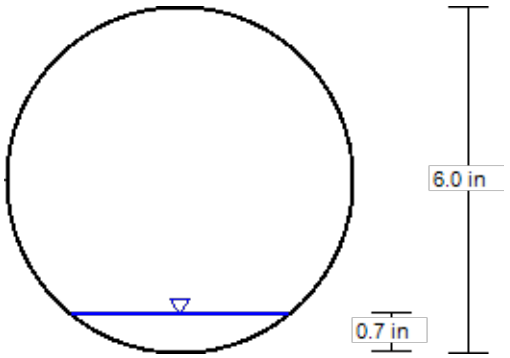
GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

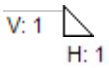
GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	11.2	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.7	in
Critical Depth	1.2	in
Channel Slope	7.000	%
Critical Slope	0.734	%

Cross Section for 6" Sewer - PDF

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	7.000 %
Normal Depth	0.7 in
Diameter	6.0 in
Discharge	25,200.00 gpd





Worksheet for 6" Sewer - Full Flow

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.013
Channel Slope	7.000 %
Normal Depth	3.9 in
Diameter	6.0 in

Results	
Discharge	725,725.78 gpd
Flow Area	0.1 ft²
Wetted Perimeter	0.9 ft
Hydraulic Radius	1.7 in
Top Width	0.48 ft
Critical Depth	5.8 in
Percent Full	65.0 %
Critical Slope	3.501 %
Velocity	8.31 ft/s
Velocity Head	1.07 ft
Specific Energy	1.40 ft
Froude Number	2.753
Maximum Discharge	1,032,071.38 gpd
Discharge Full	959,436.41 gpd
Slope Full	4.005 %
Flow Type	Supercritical

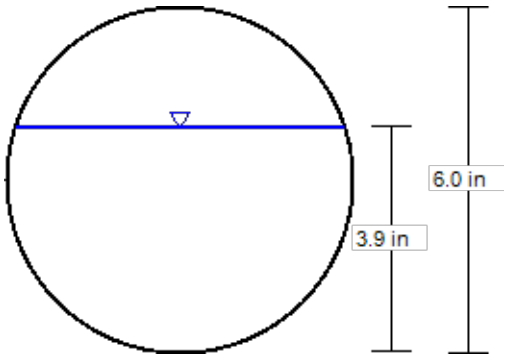
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

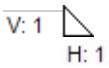
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	65.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.9 in
Critical Depth	5.8 in
Channel Slope	7.000 %
Critical Slope	3.501 %

Cross Section for 6" Sewer - Full Flow

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.013
Channel Slope	7.000 %
Normal Depth	3.9 in
Diameter	6.0 in
Discharge	725,725.78 gpd





Worksheet for 8" Sewer - ADF

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	1.000	%
Diameter	8.0	in
Discharge	27,550.00	gpd

Results		
Normal Depth	1.0	in
Flow Area	0.0	ft²
Wetted Perimeter	0.5	ft
Hydraulic Radius	0.6	in
Top Width	0.45	ft
Critical Depth	1.1	in
Percent Full	12.8	%
Critical Slope	0.701	%
Velocity	1.63	ft/s
Velocity Head	0.04	ft
Specific Energy	0.13	ft
Froude Number	1.184	
Maximum Discharge	840,099.41	gpd
Discharge Full	780,975.01	gpd
Slope Full	0.001	%
Flow Type	Supercritical	

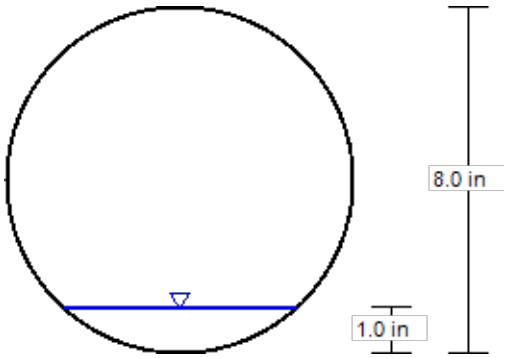
GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

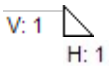
GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	12.8	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.0	in
Critical Depth	1.1	in
Channel Slope	1.000	%
Critical Slope	0.701	%

Cross Section for 8" Sewer - ADF

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	1.000 %
Normal Depth	1.0 in
Diameter	8.0 in
Discharge	27,550.00 gpd





Worksheet for 8" Sewer - PDF

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	1.000	%
Diameter	8.0	in
Discharge	120,450.00	gpd

Results		
Normal Depth	2.1	in
Flow Area	0.1	ft²
Wetted Perimeter	0.7	ft
Hydraulic Radius	1.2	in
Top Width	0.59	ft
Critical Depth	2.4	in
Percent Full	26.5	%
Critical Slope	0.644	%
Velocity	2.51	ft/s
Velocity Head	0.10	ft
Specific Energy	0.27	ft
Froude Number	1.246	
Maximum Discharge	840,099.41	gpd
Discharge Full	780,975.01	gpd
Slope Full	0.024	%
Flow Type	Supercritical	

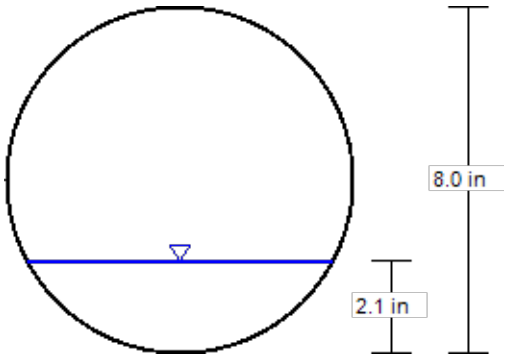
GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

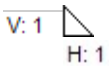
GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	26.5	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.1	in
Critical Depth	2.4	in
Channel Slope	1.000	%
Critical Slope	0.644	%

Cross Section for 8" Sewer - PDF

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	1.000 %
Normal Depth	2.1 in
Diameter	8.0 in
Discharge	120,450.00 gpd





Worksheet for 8" Sewer - Full Flow

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.013
Channel Slope	1.000 %
Normal Depth	5.2 in
Diameter	8.0 in

Results	
Discharge	590,736.08 gpd
Flow Area	0.2 ft²
Wetted Perimeter	1.3 ft
Hydraulic Radius	2.3 in
Top Width	0.64 ft
Critical Depth	5.4 in
Percent Full	65.0 %
Critical Slope	0.882 %
Velocity	3.81 ft/s
Velocity Head	0.23 ft
Specific Energy	0.66 ft
Froude Number	1.092
Maximum Discharge	840,099.41 gpd
Discharge Full	780,975.01 gpd
Slope Full	0.572 %
Flow Type	Supercritical

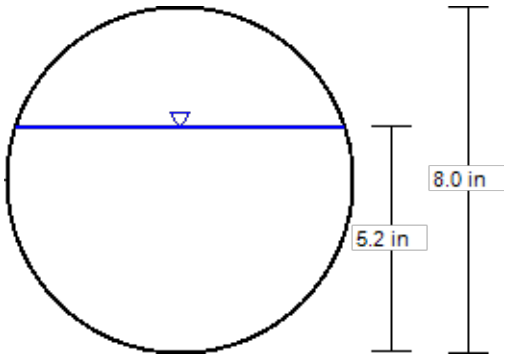
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

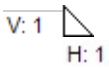
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	65.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.2 in
Critical Depth	5.4 in
Channel Slope	1.000 %
Critical Slope	0.882 %

Cross Section for 8" Sewer - Full Flow

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.013
Channel Slope	1.000 %
Normal Depth	5.2 in
Diameter	8.0 in
Discharge	590,736.08 gpd





Kimley»Horn

APPENDIX D: Cavasson Master Wastewater Report

CAVASSON

LOCATED NEAR THE NORTHWEST CORNER OF THE HAYDEN ROAD AND THE LOOP 101 FRONTAGE ROAD INTERSECTION

MASTER WASTEWATER REPORT

February 12, 2019
REVISED: March 26, 2019

Project No.: 18114-001

PREPARED FOR:
NATIONWIDE REALTY INVESTORS
375 N. FRONT STREET
COLUMBUS, OH 43215
(614) 221-2008



PREPARED BY:
HUBBARD ENGINEERING
1201 S. ALMA SCHOOL ROAD, SUITE 12000
MESA, AZ 85210
(480) 892-3313
MICHAEL S. WOLF, P

HUBB
ENGINE

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 4/17/2019

04/17/2019

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EXHIBITS

Exhibit 1 Future Build-Out Land Use Map
Exhibit 2 Master Sewer Infrastructure Map-12” [Cavasson Only]
Exhibit 3 Master Sewer Infrastructure Map-15” and 18”

1. INTRODUCTION

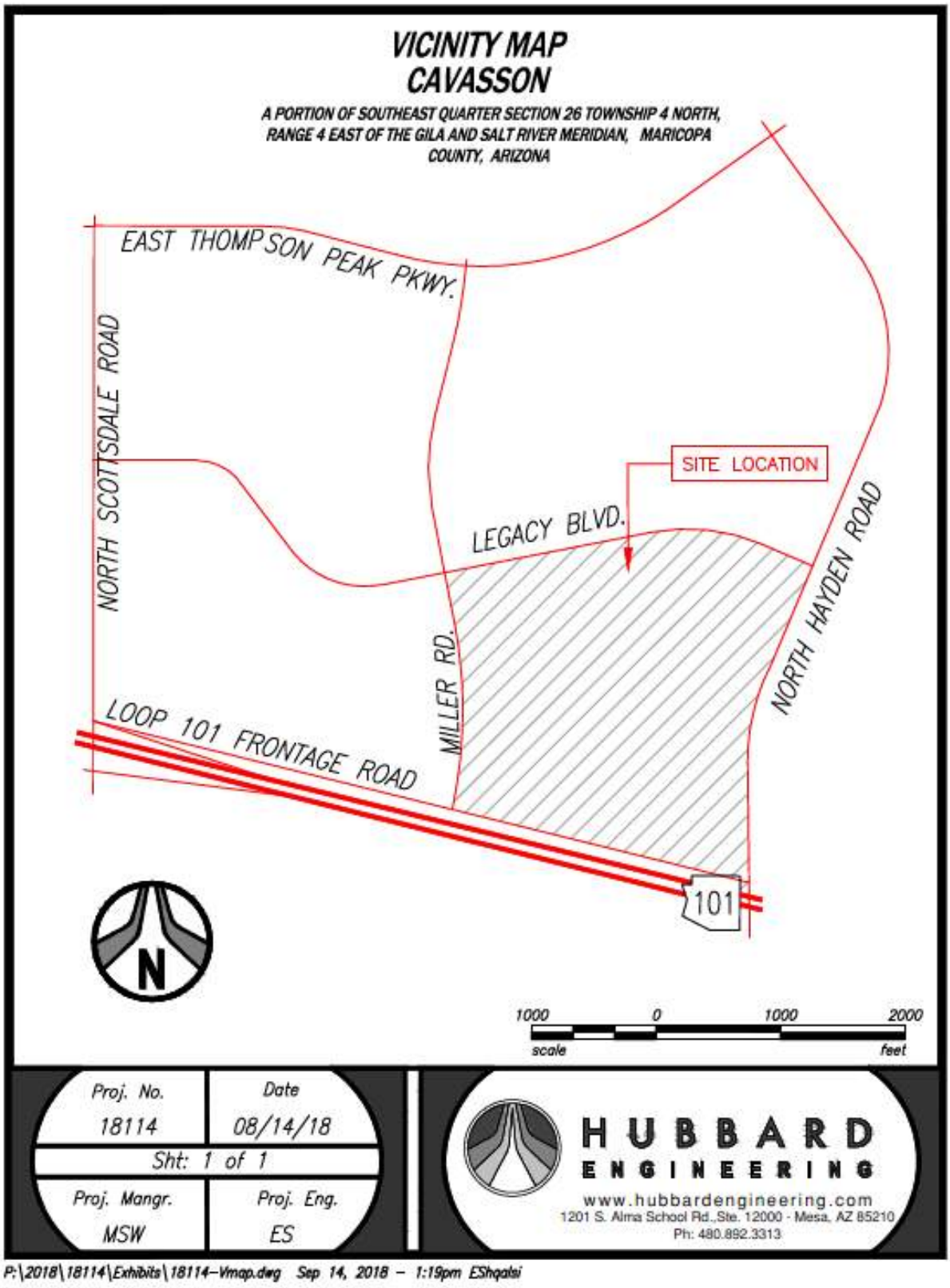
1.1 Project Scope

This report presents the results of a *Master Sewer Study* conducted by Hubbard Engineering at the request of Nationwide Realty Investors ("client"), for the Cavasson ("site"). The purpose of this report is to provide a detailed analysis for the existing and future sanitary sewer system for the Cavasson's development as required for Design Review through the City of Scottsdale per the City of Scottsdale Ordinances 4346 and 4347. The Cavasson development is a fast-growing area with a future build-out area of approximately 136+/- acres. The project site currently has one discharge point for sanitary sewer and is located at the intersection of Legacy Boulevard and future 76th Street/ Miller Road. The sewer will ultimately discharge to a sewer lift station located outside the southeast corner of the site. The analysis of this report is comparative to the City of Scottsdale's *2012 Water Reuse Master Plan Update*. This will serve as the overall Basis of Design for wastewater.

1.2 Site Description

The site is located in the southeast quarter of Section 26, Township 4N, Range 4E of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. The project site is irregular in shape and encompasses approximately 136 acres. The site is currently undeveloped, and prior to Nationwide Reality Investor's acquisition, was held in trust by the Arizona State Land Department (ASLD) as a portion of the overall Crossroads East development, which encompasses approximately 883 gross acres. The site has been rezoned as a Planned Community District. The project is bounded by the Loop 101 Freeway to the south, East Legacy Boulevard to the north, the Miller Road alignment to the west, and North Hayden Road to the east. The site location is shown in **Figure 1.1** on the *Vicinity Map*.

Figure 1.2 – Vicinity Map



1.3 Project Type

The Cavasson development is being developed by Nationwide Reality Investors as a master planned mixed use development with office, retail, hotels, and multifamily residential parcels and private roadways that run adjacent and through the development. The scope of the Master Wastewater Plan for the entire Cavasson development includes the analysis of the existing wastewater system infrastructure and the analysis, modeling and design of a proposed wastewater system for the Cavasson project site, as required by the stipulations identified in the City of Scottsdale Zoning Ordinance No. 4346. The project will be completed in a series of phases, beginning with the design and construction of Hayden Road, two proposed internal roads (Cavasson Boulevard and Claret Drive), and Miller Road. Also included with Phase 1 is the development of Parcel 1A, shown in **Exhibit 1**. The developments of Parcels 1B and 1C will follow in consecutive phases. The master wastewater analyses for the Cavasson project considered the future project phasing and development by assuming maximum permissible land use intensities as set forth in the City of Scottsdale stipulations under Scottsdale Resolution 11147 (PU V) CC 6-12-19 and then splitting the demands between smaller sub-parcels. As the sub- parcels develop within Cavasson, a separate wastewater analysis will be required to evaluate each parcel's system and wastewater demands. Any variance to the Master Wastewater Report will require an Addendum to the Master Wastewater Report and will be submitted at the same time as the site's Wastewater report.

1.4 Regulatory Issues

The following documents were utilized in the preparation of this report:

- City of Scottsdale, *Design Standards & Policies Manual*.
- City of Scottsdale, *Water Reuse Master Plan Update 2012.*
- Arizona Department of Environmental Quality (ADEQ), *Engineering Bulletin 11: Minimum Requirements for Design, Submission of Plans and Specifications of Sewage Works*
- Arizona Department of Environmental Quality (ADEQ), *Aquifer Protection Permit (APP) Program*
- Maricopa Association of Governments (MAG), *Uniform Standard Specifications and Details for Public Works Construction, 2016 Edition*
- *2008 Edition of the International Plumbing Code*
- City of Scottsdale, *Ordinance No. 4346*

2. EXISTING CONDITIONS

The City of Scottsdale has one public wastewater service area. The Cavasson development is located within the City of Scottsdale's Service Area, specifically within the city's Sub-basin 4 collection area. Refer to **Figure 2.1** for the City of Scottsdale's Wastewater Service Area Map. The City of Scottsdale has five sewage pumping facilities, all of which are used to ultimately convey wastewater flows to the city's reclamation facility within Scottsdale's Water Campus, located on Union Hills Drive and Pima Road. The facility's capacity is an average of 25 million gallons per day (mgd). Wastewater generated within Sub-basin 4 either flows by gravity to the North Pumpback Station (NPS) located at the Pima Road and the CAP canal where it is pumped to the north to the Water Campus WRP or is bypassed to the 91st Avenue WWTP. Wastewater generated from Cavasson will all flow to the NPS.

The NPS has a current pumping capacity of 34 mgd with an anticipated ultimate capacity of 47 mgd, per the CVL wastewater report (Ref. 3, pg. 8). It is stated in the CVL wastewater report that the NPS pumps approximately 16 to 18 mgd during peak periods. Wastewater is conveyed from NPS to the wastewater reclamation facility via two 30-inch force mains, one of which handles flows up to 18 mgd. The second force main is activated during times when NPS flows consistently exceed 20 mgd.

2.1 Existing Infrastructure

The existing wastewater system for the Cavasson development currently has an existing 12-inch sewer line in Hayden Road and existing dry 8-inch and 12-inch sewer lines along Legacy Boulevard (Ref..3, p.8). The sewer line along Miller Road will connect to the 12-inch sewer line. The existing sewer main in Hayden Road is built from the south of East Thompson Peak Parkway and runs down south to Princess where it connects to a 21-inch sewer line. It then continues south until it connects to the 24-inch sewer main on route to the NPS facility. Refer to **Exhibit 2** for existing infrastructure locations.

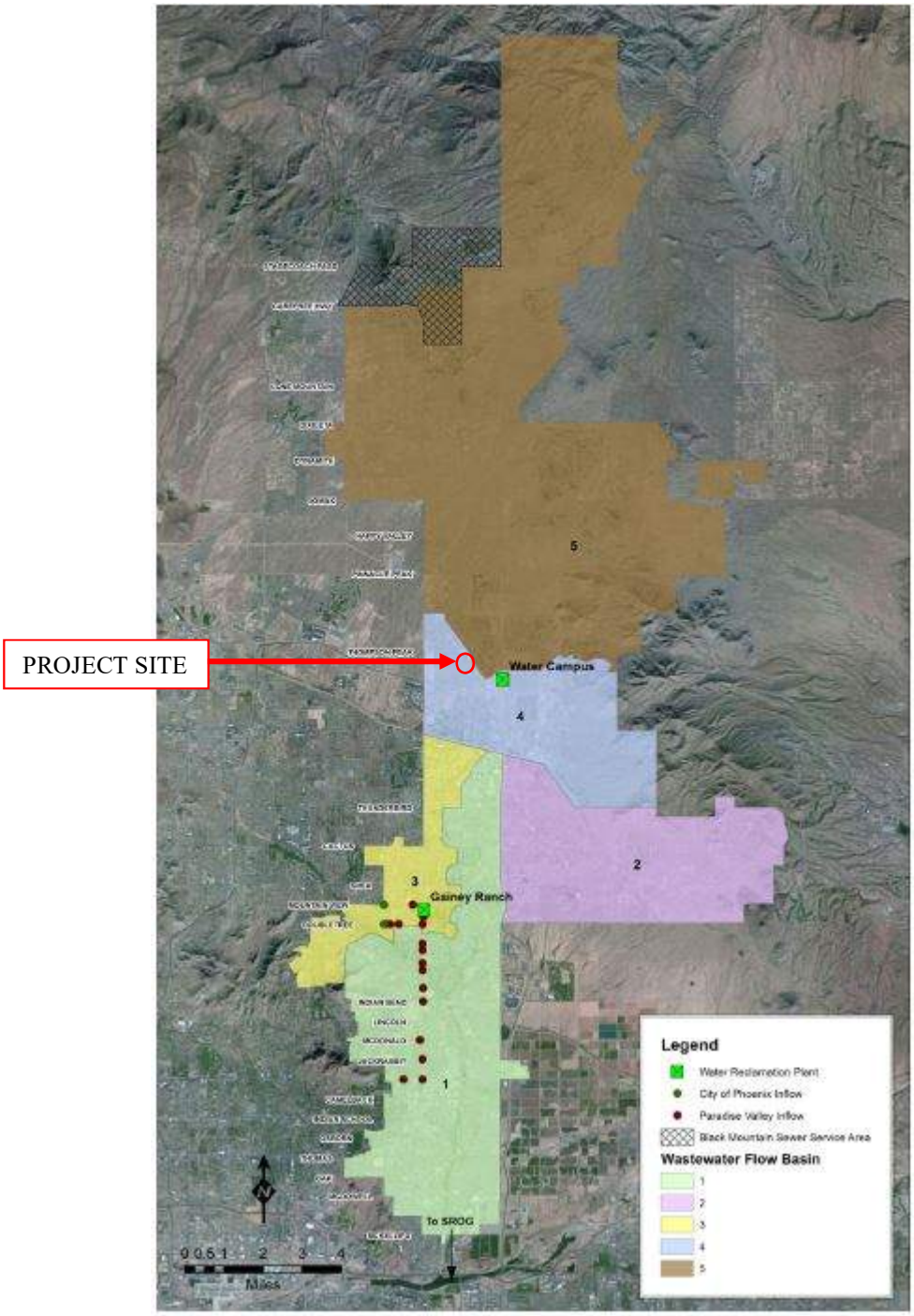
Information regarding the existing sanitary sewer system within and adjacent to the study area was gathered through existing field survey, the *City of Scottsdale Water Reuse Master Plan Update 2012,* and as stipulated in the City of Scottsdale *Design Standards and Policies Manual*, and review of as-built plans and quarter section maps. As-built information was used in locations where manholes could not be accessed. An overall planned infrastructure map of the system within the study area is shown in **Exhibit 2.** The exhibit shows the full build out of the future sewer mains and includes the existing sewer mains. The manhole rim elevations and inverts are tied to City of Scottsdale benchmark and vertical datum N.A.V.D. 88.

2.2 Zoning and Land Use

The Cavasson development consists of approximately 136 acres of undeveloped land and is currently zoned as PCP. There is a natural fall from northeast to southwest. The lots surrounding the site are also currently undeveloped.

Figure 2.1 – Wastewater Service Area Map

City of Scottsdale Water Reuse Master Plan (Fig. 1-3, pg.1-15)



3. PROPOSED CONDITIONS

3.1 Tie- Into Existing Wastewater System

Cavasson's 15-inch main sewer line will tie into the existing 12-inch sewer line at the intersection of Miller Road and Legacy Boulevard, which is approximately twenty (20) feet below grade. The line will run south towards the intersection of Miller Road and Cavasson Boulevard, then run east until the next intersection with Claret Drive. The sewer transitions to an 18" line at MH#7 just west of the intersection of Cavasson Blvd. and Claret Drive. The sewer line will continue south towards the Loop 101 and then run east in a dedicated easement just north of the Loop 101 frontage road until it reaches Hayden Road. The proposed sewer line will run by gravity until this point and then continue to a proposed sewer lift station which will be designed by other engineering consultants. Hubbard and the consultants are collaborating the tie in location and invert between the two designed lines. The proposed location is indicated on **Exhibits 2** and **3** as Hubbard's last proposed manhole, MH-21. The sewer's highest invert, which will be located near the Hayden Road and Loop 101 frontage road intersection will fall approximately seven (7) feet below the existing sewer line invert.

An interim phase may be designed during the development of Phase 1 in which the Cavasson sewer line ties directly to the existing line in Hayden depending on the sewer lift timeline. An additional line along Cavasson Boulevard will run east and connect to the existing 12-inch sewer along Hayden Road. The sewer line will be completed during Phase 1 of the project development, prior to the addition of the new roadways (Miller, Cavasson Boulevard, Claret Drive).

3.2 Land Use

The Cavasson development limits and proposed land use per delineated area are shown in **Exhibit 1.** Proposed land uses were determined from Nationwide's development plans and the City of Scottsdale's stipulations, as set forth in Resolution No. 1147. The existing and proposed demands were based on the existing and proposed land uses in **Exhibit 1** and were taken into consideration when evaluating the existing wastewater infrastructure system with existing conditions, as well as the future development. By using the maximum densities stipulated in the zoning case, the highest possible discharges are presented in this BOD. The land uses and their intensities from Resolution No. 11147 are shown in the following table:

Land Use Type (1)	Land Use Intensity (2)
Residential	1,200 – 1,600 dwelling units
Hotel	130 – 400 rooms
Retail & Service Uses	50,000 – 200,000 square feet
Office & Employment	800,000 – 1,800,000 square feet

3.3 Wastewater System Demands

3.3.1 Unit Flows and Peaking Factors

The Cavasson development is located within the City of Scottsdale's wastewater flow Sub-basin 4. The design unit flows were determined from the *City of Scottsdale Water Use Master Plan Update 2012* and were verified in coordination with the City of Scottsdale and the designer for the sewer lift station. Proposed development for the Cavasson project does not exceed the maximum densities stipulated by the City of Scottsdale. The peaking factor for the site was established by the sewer lift consultants who computed the value based on empirical data and observations of lots and areas with similar land use densities as the Cavasson development, and the lots surrounding the site. **Table 1** summarizes the design unit flows and peaking factors within the future planned development. See **Exhibit 2** for future planned Land Use Designations for Cavasson.

Table 1: Sanitary Sewer System Unit Demands and Peaking Factors

Land Use Designation	Unit Flow Rate *(Ref.2)* [gpapd]	*Peaking Factor (PF)
Office- Major	1,001	2.60
Hotel	3,985	2.60
Multi-Family	4,216	**
Commercial/ Retail	1,173	2.60

**Peaking factor provided by sewer lift consultant, which was derived and calculated from empirical data.*

***Peaking factor calculated for Multi-Family using Harmon's Formula; Population = 1.4 people/d.u.*23 d.u./ac utilizing cumulative upstream population*

***MF Unit Flow Rate** is based on: 80 gpcpd * 1.7 per/d.u. * 31 d.u./acre = 4,216 gpapd. The Peaking factor was calculated with Harmon's using 1.4 persons/d.u. and 23 d.u. per/acre*

In addition to the Cavasson development demands, the lots surrounding the development were considered in the wastewater analyses to ensure efficient infrastructure for future developments. Currently, the surrounding lots are undeveloped and do not contribute to the proposed system's capacities. In the possibility that the surrounding lots will develop their sewer lines to connect to Cavasson's proposed main line, the capacities and demands were also analyzed for the future development of these lots. These values were also compared and coordinated with the engineers designing the sewer lift station to the east of Hayden Road. As Phase 1 develops, the connection of and coordination of the inverts will be revisited. Assumptions on the surrounding

lot land use designations and densities were determined from coordinating with the City of Scottsdale's development plans and the approved zoning case. Future Lot 2 was assumed to have a similar density to the Cavasson development and was therefore analyzed in a similar manner with the same peaking factor. Lots 3 and 4, however, were assumed as residential areas with anticipated densities of 23 du/acre and 1.4 people/du. The peaking factor for these two lots was instead derived from Harmon's Formula, as shown in the following two equations:

$$PF = 1 + \frac{14}{(4 + P_1^{0.5})}$$

$$P_1 = \frac{Population}{1000}$$

$$PF_{Lot\ 3} = 3.76$$

$$PF_{Lot\ 4} = 3.45$$

These peaking factors were used in calculating the peak flows within the existing system for the existing conditions as well as the future ultimate build-out conditions. The calculations can be found in **Appendix A.** The peaking factors for the Multi-Family parcels within Cavasson were also calculated using the Harmon formula. The total population P_1 used in the calculations were the aggregate sum of all multi-family parcels upstream contributing to that sewer line.

The unit flows for the Multi-family parcels in Cavasson were calculated by taking the maximum unit count (1,600 units) and dividing it by the total multi-family area. This came out to 31 d.u./acre. The calculation for the Average Daily Demand [ADD} is as follows:

80 gpcpd * 1.7 persons/d.u. * 31 d.u. = 4,216 gpapd.

For the peaking factor the Harmon's equation for the Cavasson multi-family parcels was calculated using the standard R-5 zoning of 1.4 people/d.u. and 23 d.u./acre. This results in a lower total population which gives a higher Peak Factor in the equation. The peak factor was then applied to the ADD to arrive at the Peak Daily Demand (PDD). **Table 2** shows the cumulative population and the calculated peaking factor.

3.3.2 Average Day Demand and Peak Daily Demand

Average day and peak flow demands for the planned conditions were calculated utilizing the aforementioned unit flow rates. In addition to the unit flow rates, the *Water Reuse Master Plan* discussed incorporating a Future Development Multiplier (FDM) for character areas, such as Scottsdale Airpark, Downtown/ McDowell Corridor, South Scottsdale, and East Shea, in anticipation of revitalization and future development in these areas. Following meetings with the City of Scottsdale, it was determined that an FDM should be derived from the proposed FAR for the lots south of Legacy Blvd. rather than using the factor used in the report. The proposed 0.85 FAR was compared to the city's zoning ordinance maximum 0.8 FAR. Dividing the proposed FAR by the city's maximum results in an increased factor of 1.06. This factor was then used as the FDM. The FDM was not applied to the lots north of Legacy Boulevard.

The following equations were used to compute the ADD and PDD:

ADD (gpd) = Unit Flow (gpapd) x Area (acres) x FDM

PDD (gpd) = Average Daily Flow (gpd) x Peaking Factor

The total final sanitary sewer loadings per sub parcel of the Cavasson development are thus computed and summarized in **Table 2**.

Table 2 - Total Wastewater Demands (GPD) - Based on M.F. using 1.7 persons/d.u. for ADD & 1.4 persons/d.u. in Population for Harmons							
Parcel Number	Land Use Designation	Area [sq.ft]	Area [acres]	ADD [gpd]	PDD (ADD*PF) [gpd]	Total M.F. Population Contributing [P]	Individual Peaking Factor of all population contributing (PF)
1A-1	Office- Major	288,410	6.62	7,041.83	18,308.75	-	2.60
1A-2	Multi-Family	106,900	2.45	10,993.12	46,942.60	79	4.27
1A-3	Office- Major	210,817	4.84	5,147.32	13,383.02	-	2.60
1A-4	Office- Major	111,089	2.55	2,712.36	7,052.12	-	2.60
1A-5	Multi-Family	164,129	3.77	16,878.21	56,802.99	3,681	3.37
1A-6	Garage	203,541	4.67	0.00	0.00	-	N/A
1A-7	Hotel	127,754	2.93	12,417.75	32,286.14	-	2.60
1A-8	Commercial/ Retail	104,393	2.40	2,986.82	7,765.73	-	2.60
1B-1	Office- Major	421,088	9.67	10,281.29	26,731.36	-	2.60
1B-2	Multi-Family	431,364	9.90	44,359.36	149,858.11	3,559	3.38
1B-3	Garage	170,109	3.91	0.00	0.00	-	N/A
1C-1	Multi-Family	873,411	20.05	89,817.33	306,612.95	3,240	3.41
1C-2	Office- Major	222,112	5.10	5,423.09	14,100.04	-	2.60
1C-3	Hotel	151,582	3.48	14,733.87	38,308.06	-	2.60
1C-4	Commercial/ Retail	342,879	7.87	9,810.24	25,506.61	-	2.60
1C-5	Office- Major	215,746	4.95	5,267.66	13,695.91	-	2.60
1C-6	Multi-Family	156,694	3.60	16,113.62	68,088.99	116	4.23
1C-7	Multi-Family	191,303	4.39	19,672.63	82,609.95	141	4.20
1C-8	Multi-Family	352,473	8.09	36,246.60	145,752.78	402	4.02
1C-9	Office- Major	57,433	1.32	1,402.28	3,645.93	-	2.60
1C-10	Commercial/ Retail	154,919	3.56	4,432.46	11,524.39	-	2.60
Total				315,738	1,068,976		
A 1.06 multiplying factor was applied to the ADD to account for the FAR of 0.85.							
**Garage not included in sewer analysis since there is no demand*							
		23	du/acre	Dwelling unit density per CVL COS MWR			
		1.4	persons/du	Population density per COS DSPM - 23 du/acre			
	Harmon's Formula:						
	Peaking Factor=	$1+14/(4+P_1^{0.5})$					
	P_1=	Population/1,000					

The ADD and PDD for the lots surrounding the Cavasson site are shown in the following table:

Total Contributing Wastewater Demands (GPD)-Estimates- per CVL Crossroads East Wastewater Plan Update							
Parcel Number	Land Use Designation[1]	Area [sq.ft]	Area [acres]	ADDMM[1] [gpad]	Peak Flow[1] [gpad]	ADD [gpd]	PDD (ADD*PF) [gpd]
Lot 2	Mixed-Use	2,555,866	56.35	3,000	7,800	179,604	466,970
Lot 3	Multi-Family	993,630	22.81	3,128	11,761	71,352	268,282
Lot 4	Multi-Family	2,516,643	57.77	3,128	10,792	180,718	623,476
Total						**431,673**	**1,358,727**
*1. Land use designation and unit wastewater flows derived from Table 2. Wastewater Generation Unit Factors from the CVL Crossroads East Wastewater Master Plan Update, 2012, Table 2-4 Scottsdale Wastewater Unit Loads – COS 2012 Water Reuse Master Plan Update UPDATED to Use: 80 gal/per*1.7 per/d.u.*23 d.u./ac. [Per Scott Anderson email 03/26/19 for ADD] Peak factor provided by Wilson Engineering*							

3.4 Pipe Capacity

Following the sewer load calculations, pipe capacities for each segment of wastewater pipe within the study area were calculated using the Manning's Equation, as described in **Section 4.1** of this report. Considering the demands of only the Cavasson development, a 12-inch sewer line was computed to be sufficient in the design. However, considering the future conditions of the surrounding lots, a 15-inch and 18-inch line would be more suitable. Even at an 18-inch line, the flows from only the Cavasson development meet the minimum velocity (2.5 fps) , maximum depth ratio (d/D = 0.70) and Scottsdale's design criteria. The layout for the proposed 12-inch line is shown in **Exhibit 2** and the layout for the increased line sizes to account for the surrounding developments is shown in **Exhibit 3**. A complete summary of these calculations can be found in **Appendix A**.

The existing 12-inch sewer line in Hayden Road and the existing 12-inch sewer lines in Legacy Boulevard Road will have the future planned flows from the Cavasson development area, shown in **Table 4**. As-built plans and quarter section maps were used to determine the inverts and slopes of the existing sewer mains in Hayden Road and Legacy Boulevard.

Table 4 – Sewer Line Capacities

Existing Sewer Line Capacities	Planned Future Peak Flows from Cavasson Development	Pipe Capacity Flowing Full
	(mgpd)	(mgpd)
Hayden Road – 12-inch	0.019	4.32
Legacy Boulevard (E-W) – 12-inch	0.631	2.86
Legacy Boulevard (W-E) – 12-inch	0.011	1.43
TOTAL	0.661	

3.5 Wastewater System Summary

In general, the existing wastewater collection system within the study area has sufficient capacity to convey wastewater flows generated by the planned improvements for the Cavasson development Area. A summary of the performance criteria for the existing system can be found in **Table 5**.

Table 5 – Planned Wastewater System Performance Summary			
Criteria	**Maximum**	**Minimum**	**Average**
Full Flow Velocity (ft/s)	8.40	2.70	5.82
Full Flow Capacity (cfs)	6.60	2.20	4.57

In the analysis of the existing wastewater system, all pipe segments that were evaluated meet the City of Scottsdale's minimum requirements for slope and full flow velocity.

4. DESIGN CRITERIA

The criteria used to evaluate the existing and future sanitary sewer system within the study area is described below and is the same criteria used in the City of Scottsdale's *Water Reuse Master Plan Update 2012* and as stipulated in the City of Scottsdale *Design Standards and Policies Manual.*

4.1 Pipe Capacities

Pipe capacities of the existing system were calculated using the Manning's Equation;

$$Q = \frac{k}{n} R_h^{2/3} S^{1/2} A$$

where:
Q = flow rate, ft^3/s;
k = conversion factor = 1.4859 $ft^{1/3}/s$;

n = headloss coefficient;
R_h = hydraulic radius, ft;
S = slope, ft/ft;
A = pipe cross sectional area, ft.

A summary of the calculated full flow pipe capacities for each pipe section can be found in **Appendix A**.

4.2 Flow Depth

As described in the City of Scottsdale's *Design Standards and Policies Manual* and the *City of Scottsdale Water Use Master Plan Update 2012*, it is common practice to adopt variable depth criteria for various pipe sizes, expressed as a ratio of maximum depth flow (d) to pipe diameter (D) (Ref. 1, p.515). New sewer lines with a diameter greater than 12-inch are not to exceed a ratio of 0.70 for the ultimate peak flow condition, as this allows for system infiltration and inflow. Analysis of pipes less than 12-inch shall have a maximum permissible ratio of 0.65. The design ratios (d/D) for each pipe section within the study area were calculated for future build-out conditions. A summary of these calculations can be found in **Appendix A**.

4.3 Velocity

In accordance with the City of Scottsdale's *Design Standards and Policies Manual,* all sanitary sewers within the city shall be designed and constructed such that the mean velocity in the pipe, when flowing half full, shall not be less than two and a half (2.5) feet per second (fps). At this velocity, the sewer flow will typically provide adequate scouring to clean the pipe. This is standard practice in the design and analysis of sanitary sewer systems as it is greater than the minimum velocity which allows the pipe to be "self-cleaning" and minimizes the settlement of solids within the pipe. Additionally, the velocity of the peak flow will not exceed 10 fps. Due to the hydraulics of a circular pipe, the velocity for half-full pipe flow approaches the velocity of nearly full pipe flow. **Table 6** shows the minimum slopes for sanitary sewers to maintain self-cleaning velocities at full flow (d/D=1.0) calculated using Manning's Equation.

Table 6 - Minimum Slopes for Circular Pipes Flowing Full

Pipe Size	Minimum Slope	Pipe Capacity	
(inches)	(ft/ft)	(mgd)	(cfs)
8	0.0052	0.28	0.44
10	0.0039	0.44	0.68
12	0.0030	0.64	0.98
14	0.0025	0.86	1.34
15	0.0022	0.99	1.53
16	0.0012	1.13	1.74
18	0.0010	1.43	2.21
20	0.0010	1.76	2.73
21	0.0014	1.94	3.00
24	0.0012	3.93	3.93
27	0.0010	3.22	4.97
30	0.0009	3.97	6.14

Full flow velocities for the entire planned wastewater system were calculated for each existing section of pipe using either as-built information from plans or data also acquired in the field survey and each proposed pipe section was designed per the City of Scottsdale's *Design Standards and Policies Manual*. A summary of these calculations is included in **Appendix A**, and sections of pipe which result in a full flow velocity of less than two and a half (2.5) feet per second are mentioned in Section 2.4. These lines were only analyzed to show how much additional flow will be directed to these pipes when the area is fully developed and that the pipes could handle the additional flows.

4.4 Manhole Spacing

In accordance with the City of Scottsdale's *Design Standards and Policies Manual,* all new sanitary sewer manholes shall be installed at distances not exceeding those shown in **Table 7**.

Table 7 – Maximum Sewer Manhole Spacing	
Pipe Size	**Maximum Spacing**
8" – 15"	500 ft.
18" – 30"	600 ft.
36" – 60"	800 ft.
Over 60"	1,300 ft.

4.5 Manhole Depths and Inverts

The City of Scottsdale's *Design Standards and Policies Manual* requires that the minimum cover of the crown of a sewer pipe is to be four (4) feet to finish grade. These standards also state a maximum drop of twenty-four (24) inches between inverts without the use of a drop connection and that manholes with ninety-degree bends require a minimum 0.1-foot drop across the manhole.

A summary of the existing and proposed sewer depths and manhole inverts can be found in **Appendix A**.

4.6 Criteria Summary

Table 8 shows a summary of the criteria used in evaluating the sanitary sewer system within the study area.

Table 8 – Sanitary Sewer System Evaluation Criteria Summary[Ref.2]			
Minimum Slopes for Circular Pipes Flowing Full			
Pipe Size	**Minimum Slope**	**Pipe Capacity**	
(inches)	**(ft/ft)**	**(mgd)**	**(cfs)**
8	0.0052	0.28	0.44
10	0.0039	0.44	0.68
12	0.0030	0.64	0.98
14	0.0025	0.86	1.34
15	0.0022	0.99	1.53
16	0.0012	1.13	1.74
18	0.0010	1.43	2.21
20	0.0010	1.76	2.73
21	0.0014	1.94	3.00
24	0.0012	3.93	3.93
27	0.0010	3.22	4.97
Flow Depth Ratios (d/D)			
New Sewer Pipes, Diameter less than 12 inches			0.65
New Sewer Pipes, Diameter 12 inches and higher			0.70
Existing Sewer Pipes in Developed Areas			0.70
Headloss Coefficient (Manning's 'n')			
Gravity Pipes			0.013
Manhole Depths and Inverts			
Minimum cover over crown of sewer pipe			4.0'
Maximum drop across manhole without drop connection			24"
Minimum drop across manhole			0.10'
Peaking Factors			
Cavasson			2.60
Lot 2			2.60
Lot 3			3.76
Lot 4			3.45

5. SUMMARY AND CONCLUSIONS

A summary of the wastewater system analysis in this report is presented below.

1. Design unit flows were determined from the approved City of Scottsdale's *2012 Water Reuse Master Plan Update Final* report (Table 2).
2. The site is located in the City of Scottsdale's wastewater Sub-basin 4.
3. A 12-inch water line is sufficient for the maximum loads for the Cavasson site. However, a 15-inch and 18-inch line was designed to consider the future development of surrounding lots and upsizing of these lines should be part of a payback agreement.
4. A sewer lift station to the east of Hayden is being designed. Hubbard is collaborating the tie-in location and invert with the City's consultant.
5. Pipe capacity was determined for the proposed site conditions and for the expectation that lots surrounding Cavasson will develop.
6. The existing system is sufficient to accommodate the additional flow generated from planned future improvements within the study area, in accordance with the land use classifications identified in the City's current General Plan.

6. References

1. City of Scottsdale, *Design Standards & Policies Manual*, January 18, 2018.
2. Carollo Engineers, *City of Scottsdale Water Reuse Master Plan Update 2012,* 2012.
3. Coe & Van Loo Consultants, Inc. (CVL) *Arizona State Land Department- Crossroads East Wastewater Master Plan Update,* April 13, 2008.
4. Arizona Department of Environmental Quality (ADEQ). *Engineering Bulletin 11: Minimum Requirements for Design, Submission of Plans and Specifications of Sewage Works.* May 1978.
5. Arizona Department of Environmental Quality (ADEQ). *Aquifer Protection Permit (APP) Program*.
6. Maricopa Association of Governments (MAG). *Uniform Standard Specifications and Details for Public Works Construction.* January 2016.
7. International Code Council. *2012 Edition of the International Plumbing Code*. January 1, 2012
8. City of Scottsdale, *Ordinance No. 4346,* June 17, 2018.
9. City of Scottsdale, *Ordinance No. 1147,* June 17, 2018.

Appendix A
Sewer Load Calculations
Cavasson

SEWER DEMAND CALCULATION SHEET
Cavasson Master Sewer Plan
HUBBARD ENGINEERING
PROJECT NO. 18114-001

References: 1. City of Scottsdale, Design Standards and Policies Manual, 2018
2. Carollo, City of Scottsdale 2012 Water Reuse Master Plan Update Final Table 2-4

Calculations:

Proposed FAR	0.85
Max FAR Stipulated	0.80
Future Development Multiplier	1.06

Sanitary Sewer System Unit Demands and Peaking Factors		
Land Use Designation	Unit Flow Rate *(Ref.2)* [gpapd]	*Peaking Factor (PF)
Office- Major	1,001	2.60
Hotel	3,985	2.60
Multi-Family	4,216	**
Commercial/ Retail	1,173	2.60
**Peaking factor provided by sewer lift consultant, which was derived and calcualted from empircal data.*		
***Peaking factor calculated for Multi-Family using Harmon's Formula; Population = 1.4 people/d.u.*23 d.u./ac utilizing cummulative upstream population*		
***MF Unit Flow Rate** is based on: 80 gpcpd * 1.7 per/d.u. * 31 d.u./acre = 4,216 gpapd. The Peaking factor was calculated with Harmon's using 1.4 persons/d.u. and 23 d.u. per/acre*		

Average Day Demand = (Unit Flow Rate*Acres*1.06) [*gpd*]
Peak Day Demand = Average Day Demand*PF [*gpd*]

Table 2 - Total Wastewater Demands (GPD) - Based on M.F. using 1.7 persons/d.u. for ADD & 1.4 persons/d.u. in Population for Harmons

Parcel Number	Land Use Designation	Area [sq.ft]	Area [acres]	ADD [gpd]	PDD (ADD*PF) [gpd]	Total M.F. Population Contributing [P]	Individual Peaking Factor of all population contributing (PF)
1A-1	Office- Major	288,410	6.62	7,041.83	18,308.75	-	2.60
1A-2	Multi-Family	106,900	2.45	10,993.12	46,942.60	79	4.27
1A-3	Office- Major	210,817	4.84	5,147.32	13,383.02	-	2.60
1A-4	Office- Major	111,089	2.55	2,712.36	7,052.12	-	2.60
1A-5	Multi-Family	164,129	3.77	16,878.21	56,802.99	3,681	3.37
1A-6	Garage	203,541	4.67	0.00	0.00	-	N/A
1A-7	Hotel	127,754	2.93	12,417.75	32,286.14	-	2.60
1A-8	Commercial/ Retail	104,393	2.40	2,986.82	7,765.73	-	2.60
1B-1	Office- Major	421,088	9.67	10,281.29	26,731.36	-	2.60
1B-2	Multi-Family	431,364	9.90	44,359.36	149,858.11	3,559	3.38
1B-3	Garage	170,109	3.91	0.00	0.00	-	N/A
1C-1	Multi-Family	873,411	20.05	89,817.33	306,612.95	3,240	3.41
1C-2	Office- Major	222,112	5.10	5,423.09	14,100.04	-	2.60
1C-3	Hotel	151,582	3.48	14,733.87	38,308.06	-	2.60
1C-4	Commercial/ Retail	342,879	7.87	9,810.24	25,506.61	-	2.60
1C-5	Office- Major	215,746	4.95	5,267.66	13,695.91	-	2.60
1C-6	Multi-Family	156,694	3.60	16,113.62	68,088.99	116	4.23
1C-7	Multi-Family	191,303	4.39	19,672.63	82,609.95	141	4.20
1C-8	Multi-Family	352,473	8.09	36,246.60	145,752.78	402	4.02
1C-9	Office- Major	57,433	1.32	1,402.28	3,645.93	-	2.60
1C-10	Commercial/ Retail	154,919	3.56	4,432.46	11,524.39	-	2.60
Total				315,738	1,068,976		

A 1.06 multiplying factor was applied to the ADD to account for the FAR of 0.85.
**Garage not included in sewer analysis since there is no demand*

	23	du/acre	Dwelling unit density per CVL COS MWR
	1.4	persons/du	Population density per COS DSPM - 23 du/acre

Harmon's Formula:

Peaking Factor= $1+14/(4+P_1^{0.5})$
P_1= Population/1,000

Peaking Factor:	2.60	Lot 2	
Peaking Factor:	3.76	Lot 3	Calculated per Harmon's
Peaking Factor:	3.45	Lot 4	Formula

Lot 2 ADD = (ADMM*Acres*1.06) [*gpd*]
Lots 3 & 4 ADD = (ADMM*Acres) [*gpd*]

Total Contributing Wastewater Demands (GPD)-Estimates- per CVL Crossroads East Wastewater Plan Update							
Parcel Number	Land Use Designation[1]	Area [sq.ft]	Area [acres]	ADDMM[1] [gpad]	Peak Flow[1] [gpad]	ADD [gpd]	PDD (ADD*PF) [gpd]
Lot 2	Mixed-Use	2,555,866	56.35	3,000	7,800	179,604	466,970
Lot 3	Multi-Family	993,630	22.81	3,128	11,761	71,352	268,282
Lot 4	Multi-Family	2,516,643	57.77	3,128	10,792	180,718	623,476
Total						**431,673**	**1,358,727**

*1. Land use designation and unit wastewater flows derived from Table 2. Wastewater Generation Unit Factors from the CVL Crossroads East Wastewater Master Plan Update, 2012, Table 2-4 Scottsdale Wastewater Unit Loads – COS 2012 Water Reuse Master Plan Update UPDATED to Use: 80 gal/per*1.7 per/d.u.*23 d.u./ac. [Per Scott Anderson email 03/26/19 for ADD] Peak factor provided by Wilson Engineering*

Appendix B
Sewer Capacity Calculations
Cavasson

SANITARY SEWER SYSTEM ANALYSIS (PROPOSED CONDITION-18-INCH LAYOUT-0.16%)
Cavasson Master Sewer Plan
HUBBARD ENGINEERING
PROJECT NO.18114-001

Project Name: Cavasson Master Sewer Plan
Project No: 18114-001

Prepared By: ES
Revised By: MSW

Date: 12/5/2018
Date: 3/27/2019

Purpose: Develop a sewer design analysis based on as-built sewer information for the existing service area. (Ref. 3)

Criteria:

Minimum Velocity =	2.5 [ft/s]	(Flowing Full)
Maximum Velocity =	10 [ft/s]	(Flowing Full)
Manning's 'n' =	0.013	(Flowing Full)

Assumptions: 1. Existing 12" line in Legacy and 12" line in Hayden are currently dry.

References:
1. City of Scottsdale, Design Standards and Policies Manual, 2018
2. Carollo, City of Scottsdale 2012 Water Reuse Master Plan Update Final
3. Hayden Road As-Builts, May 2005
4. Legacy Road As-Builts, June 2009

Note: " * " - denotes onsite manhole nodes for the purpose of demonstrating preliminary design.

Attachments:

Tie in at Legacy/ Miller intersction to Hayden/Frontage Intersectio

Sewer Analysis (Proposed Condition)

Upstream Manhole I.D.	Downstream Manhole I.D.	Contributing Area	Contributing Area [acres]	RIM Upstream Manhole I.D.	RIM Downstream Manhole I.D.	Inv Upstream Manhole I.D.	Inv Downstream Manhole I.D.	Pipe Size [in]	Manning's n	Cover [ft]	Line I.D.	Length [ft]	Slope [ft/ft]	ADF [mgpd]	Cumulative ADF [mgpd]	Peaking Factor	PDF [mgd]	Cumulative Peak [mgpd]	Pipe Capacity Flowing Full [mgpd]	Depth [in]	d/D [Max = 0.70]	Full Flow Velocity [ft/s]	Pipe Capacity [cfs]
SSMH#7	MH-1	1C-2,1C-5,Lot 3, Lot 4	98.6	1634.50	1634.30	1610.87	1605.05	12	0.013	22.63	Line 1	74.60	0.07800	0.26276	0.26276	3.50	0.920	0.91955	6.431	3.06	0.26	12.70	9.97
MH-1	MH #2	1C-1, Lot 2	78.7	1634.30	1629.26	1610.19	1609.36	15	0.013	22.86	Line 2	309.00	0.00270	0.26942	0.53218	2.87	0.774	1.69314	2.169	9.97	0.66	2.70	3.31
MH #2	MH #3	-		1629.26	1624.90	1609.26	1607.72	15	0.013	18.75	Line 3	266.50	0.00270	0.00000	0.53218	0.00	0.000	1.69314	2.169	9.97	0.66	2.70	3.31
MH #3	MH #4	-		1624.90	1620.54	1608.44	1607.72	15	0.013	15.21	Line 4	266.50	0.00270	0.00000	0.53218	2.87	0.000	1.69314	2.169	9.97	0.66	2.70	3.31
MH #4	MH #5	1B-2	9.9	1620.54	1624.21	1607.62	1608.38	15	0.013	11.67	Line 5	414.00	0.00300	0.04436	0.57654	3.38	0.150	1.84299	2.287	10.20	0.68	2.90	3.56
MH #5	MH #6	-		1624.21	1629.21	1608.28	1605.04	15	0.013	14.68	Line 6	414.20	0.00300	0.00000	0.57654	0.00	0.000	1.84299	2.287	10.20	0.68	2.90	3.56
MH #6	MH #7	-		1629.21	1632.29	1604.94	1604.11	15	0.013	23.02	Line 7	253.40	0.00330	0.00000	0.57654	0.00	0.000	1.84299	2.398	9.86	0.66	3.00	3.68
MH #7	MH #8	1C-8, 1C-7,1C-6	15.7	1632.29	1633.13	1604.01	1603.64	18	0.013	26.78	Line 8	232.25	0.00330	0.07203	0.64857	4.12	0.296	2.13945	3.900	9.51	0.53	3.40	6.01
MH #8	MH #9	1A-5, 1A-2	6.2	1633.13	1628.84	1603.54	1602.68	18	0.013	28.09	Line 9	232.20	0.00370	0.02787	0.67644	3.72	0.104	2.24319	4.129	9.46	0.53	3.60	6.36
MH #9	MH #10			1628.84	1621.44	1602.58	1601.29	18	0.013	24.76	Line 10	348.50	0.00370	0.00000	0.67644	0.00	0.000	2.24319	4.129	9.46	0.53	3.60	6.36
MH #10	MH #11	1A-4,B-1	12.2	1621.44	1613.25	1601.19	1599.74	18	0.013	18.75	Line 11	392.00	0.00370	0.01299	0.68944	2.60	0.034	2.27698	4.129	9.54	0.53	3.60	6.36
MH #11	MH #12	-		1613.25	1611.97	1599.64	1599.24	18	0.013	12.11	Line 12	107.10	0.00370	0.00000	0.68944	0.00	0.000	2.27698	4.129	9.54	0.53	3.60	6.36
MH #12	MH #14	-		1611.97	1610.09	1599.14	1597.86	18	0.013	11.33	Line 13	318.10	0.00370	0.00000	0.68944	0.00	0.000	2.27698	4.129	9.54	0.53	3.60	6.36
MH #14	MH #16	1A-3	4.8	1610.09	1610.64	1597.76	1596.08	18	0.013	10.83	Line 14	283.40	0.00370	0.00515	0.69459	0.00	0.013	2.29036	4.129	9.57	0.53	3.60	6.36
MH #16	MH #17	1A-1	6.6	1610.64	1611.08	1595.98	1595.56	18	0.013	13.16	Line 15	112.40	0.00370	0.00704	0.70163	0.00	0.018	2.30867	4.129	9.62	0.53	3.60	6.36
MH #17	MH #19	-		1611.08	1613.67	1595.46	1593.66	18	0.013	14.12	Line 16	126.60	0.00370	0.00000	0.70163	0.00	0.000	2.30867	4.129	9.62	0.53	3.60	6.36
MH #19	MH #20	-		1613.67	1610.25	1593.56	1592.37	18	0.013	18.61	Line 17	320.80	0.00370	0.00000	0.70163	0.00	0.000	2.30867	4.129	9.62	0.53	3.60	6.36
MH #20	MH #21	-		1610.25	1614.65	1592.27	1591.79	18	0.013	16.48	Line 18	129.60	0.00370	0.00000	0.70163	0.00	0.000	2.30867	4.129	9.62	0.53	3.60	6.36

Tie in to Proposed Manhole in Proposed Roadway 1 to Proposed Roadway/Hayden Road Intersectio

Sewer Analysis (Proposed Condition)

Upstream Manhole I.D.	Downstream Manhole I.D.	Contributing Area	Contributing Area [acres]	RIM Upstream Manhole I.D.	RIM Downstream Manhole I.D.	Inv Upstream Manhole I.D.	Inv Downstream Manhole I.D.	Pipe Size [in]	Manning's n	Cover [ft]	Line I.D.	Length [ft]	Slope [ft/ft]	ADF [mgd]	Cumulative ADF [mgd]	Peaking Factor	PDF [mgd]	Cumulative Peak [mgd]	Pipe Capacity Flowing Full [mgpd]	Depth	d/D	Full Flow Velocity [ft/s]	Pipe Capacity [cfs]
MH#22	MH#23	1C-9, 1C-3, 1A-7, 1A-8	10.1	1634.67	1633.50	1622.25	1620.62	12	0.013	11.42	Line 20	448.20	0.00300	0.03154	0.03154	2.60	0.082	0.08201	1.261	2.07	0.17	2.50	1.96
SSMH #13	SSMH #7	1C-4,1C-10	11.4	1651.88	1654.88	1646.56	1644.59	12	0.013	4.32	EX. 13-14	498.00	0.00390	0.01424	0.01424	2.60	0.037	0.03703	1.438	1.33	0.11	2.80	2.20

SANITARY SEWER SYSTEM ANALYSIS (PROPOSED CONDITION-12-INCH LAYOUT)
Cavasson Master Sewer Plan
HUBBARD ENGINEERING
PROJECT NO.18114-001

Project Name: Cavasson Master Sewer Plan
Project No: 18114-001

Prepared By: ES
Revised By: MSW

Date: 12/5/2018
Date: 3/27/2019

Purpose: Develop a sewer design analysis based on as-built sewer information for the existing service area. (Ref. 1)

Criteria:

Minimum Velocity =	2.5 [ft/s]	(Flowing Full)
Maximum Velocity =	10 [ft/s]	(Flowing Full)
Manning's 'n' =	0.013	(Flowing Full)

Assumptions: 1. Existing 12" line in Legacy and 12" line in Hayden are currently dry.

References:
1. City of Scottsdale, Design Standards and Policies Manual, 2018
2. Carollo, City of Scottsdale 2012 Water Reuse Master Plan Update Final
3. Hayden Road As-Builts, May 2005
4. Legacy Road As-Builts, June 2009

Note: " * " - denotes onsite manhole nodes for the purpose of demonstrating preliminary design.

Attachments:

This Segment of pipe is the same for Cavasson Use only as the Ultimate Design oversizing

Tie in at Legacy/ Miller intersction to Hayden/Frontage Intersectio

Sewer Analysis (Proposed Condition)

Upstream Manhole I.D.	Downstream Manhole I.D.	Contributing Area	Contributing Area [acres]	RIM Upstream Manhole I.D.	RIM Downstream Manhole I.D.	Inv Upstream Manhole I.D.	Inv Downstream Manhole I.D.	Pipe Size [in]	Manning's n	Cover [ft]	Line I.D.	Length [ft]	Slope [ft/ft]	ADF [mgpd]	Cumulative ADF [mgpd]	Peaking Factor	PDF [mgd]	Cumulative Peak [mgpd]	Pipe Capacity Flowing Full [mgpd]	Depth [in]	d/D [Max = 0.70]	Full Flow Velocity [ft/s]	Pipe Capacity [cfs]
SSMH#7	MH-1	1C-2,1C-5,1C-7,1C-6	785,854	1634.50	1634.30	1610.87	1605.05	12	0.013	22.63	Line 1	74.60	0.07800	0.04648	0.04648	3.84	0.178	0.17849	6.431	1.37	0.11	12.70	9.97
MH-1	MH #2	1C-1	873,411	1634.30	1629.26	1610.19	1609.36	12	0.013	23.11	Line 2	309.00	0.00300	0.08982	0.13629	3.41	0.307	0.48511	1.261	5.16	0.43	2.50	1.96
MH #2	MH #3	-		1629.26	1624.90	1609.26	1607.72	12	0.013	19.00	Line 3	266.50	0.00300	0.00000	0.13629	0.00	0.000	0.48511	1.261	5.16	0.43	2.50	1.96
MH #3	MH #4	-	-	1624.90	1620.54	1608.44	1607.72	12	0.013	15.46	Line 4	266.50	0.00300	0.00000	0.13629	3.41	0.467	0.95208	1.261	7.79	0.65	2.50	1.96
MH #4	MH #5	1B-2	431,364	1620.54	1624.21	1607.62	1608.38	15	0.013	11.67	Line 5	414.00	0.00300	0.04436	0.18065	3.38	0.150	1.10194	2.287	7.34	0.49	2.90	3.56
MH #5	MH #6	-		1624.21	1629.21	1608.28	1605.04	15	0.013	14.68	Line 6	414.20	0.00300	0.00000	0.18065	0.00	0.000	1.10194	2.287	7.34	0.49	2.90	3.56
MH #6	MH #7	-		1629.21	1632.29	1604.94	1604.11	15	0.013	23.02	Line 7	253.40	0.00330	0.00000	0.18065	0.00	0.000	1.10194	2.398	7.14	0.48	3.00	3.68
MH #7	MH #8	1C-8	352,473	1632.29	1633.13	1604.01	1603.64	15	0.013	27.03	Line 8	232.25	0.00330	0.03625	0.21690	4.02	0.146	1.24769	2.398	7.68	0.51	3.00	3.68
MH #8	MH #9	1A-2,1A-5	271,029	1633.13	1628.84	1603.54	1602.68	15	0.013	28.34	Line 9	232.20	0.00370	0.02787	0.24477	3.72	0.104	1.35143	2.539	7.78	0.52	3.20	3.93
MH #9	MH #10			1628.84	1621.44	1602.58	1601.29	15	0.013	25.01	Line 10	348.50	0.00370	0.00000	0.24477	0.00	0.000	1.35143	2.539	7.78	0.52	3.20	3.93
MH #10	MH #11	1A-4,1A-3,A-1,B-1	1,031,404	1621.44	1613.25	1601.19	1599.74	15	0.013	19.00	Line 11	392.00	0.00370	0.02518	0.26995	2.60	0.065	1.41691	2.539	8.01	0.53	3.20	3.93
MH #11	MH #12	-		1613.25	1611.97	1599.64	1599.24	15	0.013	12.36	Line 12	107.10	0.00370	0.00000	0.26995	0.00	0.000	1.41691	2.539	8.01	0.53	3.20	3.93
MH #12	MH #14	-		1611.97	1610.09	1599.14	1597.86	15	0.013	11.58	Line 13	318.10	0.00370	0.00000	0.26995	0.00	0.000	1.41691	2.539	8.01	0.53	3.20	3.93
MH #14	MH #16	-		1610.09	1610.64	1597.76	1596.08	15	0.013	11.08	Line 14	283.40	0.00370	0.00000	0.26995	0.00	0.000	1.41691	2.539	8.01	0.53	3.20	3.93
MH #16	MH #17	-		1610.64	1611.08	1595.98	1595.56	15	0.013	13.41	Line 15	112.40	0.00370	0.00000	0.26995	0.00	0.000	1.41691	2.539	8.01	0.53	3.20	3.93
MH #17	MH #19	-		1611.08	1613.67	1595.46	1593.66	15	0.013	14.37	Line 16	126.60	0.00370	0.00000	0.26995	0.00	0.000	1.41691	2.539	8.01	0.53	3.20	3.93
MH #19	MH #20	-		1613.67	1610.25	1593.56	1592.37	15	0.013	18.86	Line 17	320.80	0.00370	0.00000	0.26995	0.00	0.000	1.41691	2.539	8.01	0.53	3.20	3.93
MH #20	MH #21	-		1610.25	1614.65	1592.27	1591.79	15	0.013	16.73	Line 18	129.60	0.00370	0.00000	0.26995	0.00	0.000	1.41691	2.539	8.01	0.53	3.20	3.93

Tie in to Proposed Manhole in Proposed Roadway 1 to Proposed Roadway/Hayden Road Intersection

Sewer Analysis (Proposed Condition Contributing)

Upstream Manhole I.D.	Downstream Manhole I.D.	Contributing Area	Contributing Area [acres]	RIM Upstream Manhole I.D.	RIM Downstream Manhole I.D.	Inv Upstream Manhole I.D.	Inv Downstream Manhole I.D.	Pipe Size [in]	Manning's n	Cover [ft]	Line I.D.	Length [ft]	Slope [ft/ft]	ADF [mgd]	Cumulative ADF [mgd]	Peaking Factor	PDF [mgd]	Cumulative Peak [mgd]	Pipe Capacity Flowing Full [mgpd]	Depth [in]	d/D [Max = 0.75]	Full Flow Velocity [ft/s]	Pipe Capacity [cfs]
MH#22	MH#23	1C-9,1C-3,1A-7,1A-8	409,905.50	1634.70	1628.00	1610.87	1609.94	12	0.013	22.83	Line 1	308.97	0.00300	0.01370	0.01370	3.94	0.054	0.05400	1.261	1.69	0.14	2.50	1.96
SSMH #13	SSMH #7	1C-4,1C-10	497,797.83	1651.88	1654.88	1646.56	1644.59	8	0.013	4.65	EX. 13-14	498.00	0.00390	0.00820	0.00820	4.76	0.039	0.03900	0.488	1.53	0.19	2.20	0.77

SANITARY SEWER SYSTEM ANALYSIS (EXISTING LINES)
Cavasson Master Sewer Plan
HUBBARD ENGINEERING
PROJECT NO.18114-001

Project Name: Cavasson Master Sewer Plan
Project No: 18114-001

Prepared By: ES
Revised By: MSW

Date: 12/5/2018
Date: 2/12/2019

Purpose: Develop a sewer design analysis based on as-built sewer information for the existing service area. (Ref. 3)

Criteria:

Minimum Velocity =	2.5 [ft/s]	(Flowing Full)
Maximum Velocity =	10 [ft/s]	(Flowing Full)
Manning's 'n' =	0.013	(Flowing Full)

Assumptions: 1. Existing 12" line in Legacy and 12" line in Hayden are currently dry.

References:
1. City of Scottsdale, Design Standards and Policies Manual, 2018
2. Carollo, City of Scottsdale 2012 Water Reuse Master Plan Update Final
3. Hayden Road As-Builts, May 2005
4. Legacy Road As-Builts, June 2009

Note: " * " - denotes onsite manhole nodes for the purpose of demonstrating preliminary design.

Attachments: Capacities of existing sewer lines with Cavasson site contributions. **0.972**

Sewer Analysis (Existing-Legacy to Hayden)

Upstream Manhole I.D.	Downstream Manhole I.D.	Contributing Area	Contributing Area [acres]	RIM Upstream Manhole I.D.	RIM Downstream Manhole I.D.	Inv Upstream Manhole I.D.	Inv Downstream Manhole I.D.	Pipe Size [in]	Manning's n	Cover [ft]	Line I.D.	Length [ft]	Slope [ft/ft]	ADF [mgd]	Cumulative ADF [mgd]	Peaking Factor	PDF [mgd]	Cumulative Peak [mgd]	Pipe Capacity Flowing Full [mgpd]	Depth [in]	d/D [Max = 0.70]	Full Flow Velocity [ft/s]	Pipe Capacity [cfs]
SSMH-13	SSMH-7	1C-4,1C-10	497,798	1655.28	1654.88	1646.56	1644.59	12	0.013	7.72	Legacy (W-E)	498.00	0.00390	0.01424	0.01424	2.60	0.037	0.03703	1.438	1.33	0.11	2.80	2.20
SSMH-7	SSMH-6	1C-4,1C-10	497,798	1654.88	1649.82	1644.53	1639.34	12	0.013	9.35	HAYDEN	309.00	0.01800	0.00000	0.01424	0.00	0.000	0.03703	3.089	0.92	0.08	6.10	4.79
SSMH-6	SSMH-5	1C-4,1C-10	497,798	1649.82	1641.14	1638.94	1629.99	12	0.013	9.88	HAYDEN	490.00	0.01900	0.00000	0.01424	0.00	0.000	0.03703	3.174	0.91	0.08	6.30	4.95
SSMH-5	SSMH-4	1C-4,1C-10	497,798	1641.14	1634.35	1629.95	1620.75	12	0.013	10.19	HAYDEN	482.00	0.01900	0.00000	0.01424	0.00	0.000	0.03703	3.174	0.91	0.08	6.30	4.95
SSMH-4	SSMH-3	1C-4,1C-10,1C-9,1C-3,1A-7,1A-8	938,959	1634.35	1630.02	1620.83	1613.39	12	0.013	12.52	HAYDEN	489.00	0.01520	0.04578	0.06003	1.79	0.082	0.11904	2.839	1.68	0.14	5.60	4.40
SSMH-3	SSMH-2	1C-4,1C-10,1C-9,1C-3,1A-7,1A-8	938,958.75	1630.02	1617.95	1613.39	1606.15	12	0.013	15.63	HAYDEN	485.00	0.01490	0.00000	0.06003	0.00	0.000	0.11904	2.811	1.68	0.14	5.50	4.32
SSMH-2	SSMH-1	1C-4,1C-10,1C-9,1C-3,1A-7,1A-8	938,958.75	1617.95	1614.95	1603.96	1600.61	12	0.013	12.99	HAYDEN	102.00	0.02160	0.00000	0.06003	0.00	0.000	0.11904	3.384	1.54	0.13	6.70	5.26
SSMH-1	EX-SSMH	1C-4,1C-10,1C-9,1C-3,1A-7,1A-8	938,958.75	1614.91	1614.65	1600.61	1604.00	12	0.013	13.30	HAYDEN	97.00	0.03450	0.00000	0.06003	0.00	0.000	0.11904	4.277	1.38	0.11	8.40	6.60

Sewer Analysis (Existing-Legacy to Miller)

Upstream Manhole I.D.	Downstream Manhole I.D.	Contributing Area	Contributing Area [acres]	RIM Upstream Manhole I.D.	RIM Downstream Manhole I.D.	Inv Upstream Manhole I.D.	Inv Downstream Manhole I.D.	Pipe Size [in]	Manning's n	Cover [ft]	Line I.D.	Length [ft]	Slope [ft/ft]	ADF [mgd]	Cumulative ADF [mgd]	Peaking Factor	PDF [mgd]	Cumulative Peak [mgd]	Pipe Capacity Flowing Full [mgpd]	Depth [in]	d/D [Max = 0.70]	Full Flow Velocity [ft/s]	Pipe Capacity [cfs]
SSMH-12	SSMH-11	1C-2,1C-5,1C-7,1C-6,Lot 3, Lot 4	937,436	1651.79	1654.88	1644.33	1639.60	12	0.013	6.46	Legacy (E-W)	307.00	0.01540	0.29855	0.29855	3.58	1.070	1.07025	2.857	5.09	0.42	5.60	4.40
SSMH-11	SSMH-10	-	-	1649.51	1646.76	1639.57	1633.90	12	0.013	8.94	Legacy (E-W)	379.00	0.01500	0.00000	0.29855	0.00	0.000	1.07025	2.820	5.13	0.43	5.60	4.40
SSMH-10	SSMH-9	-	-	1646.76	1642.60	1633.81	1626.42	12	0.013	11.95	Legacy (E-W)	499.00	0.01540	0.00000	0.29855	0.00	0.000	1.07025	2.857	5.09	0.42	5.60	4.40
SSMH-9	SSMH-8	-	-	1642.60	1638.28	1626.09	1618.60	12	0.013	15.51	Legacy (E-W)	501.00	0.01500	0.00000	0.29855	0.00	0.000	1.07025	2.820	5.13	0.43	5.60	4.40
SSMH-8	SSMH-7	-	-	1634.35	1630.02	1618.55	1611.09	12	0.013	14.80	Legacy (E-W)	489.00	0.01520	0.00000	0.29855	0.00	0.000	1.07025	2.839	5.11	0.43	5.60	4.40

Appendix C
Correspondence with Sewer Lift Consultants
Cavasson

Ema Shqalsi

From: Yamani, Srikanth <srikanth.yamani@wilson-engineers.com>
Sent: Thursday, October 18, 2018 10:29 AM
To: Ema Shqalsi
Cc: Todd, Steve M.; Willgohs, Martin O.
Subject: RE: NRCI Campus-Sewer Capacities/Inverts and Water Demands

Ema,

We looked into your Average Daily Demand (ADD) values and they look close to our numbers (although the acreage for the Lots 1,2,3, and 4 vary slightly).

The invert for 18" line on your attachments shows 1595.83 but your email below indicates 1596.20. Let us know. We will rely on your invert elevations for continuation of sewer lines from SE corner of Hayden to the proposed lift station.

Let us know if you have any questions or comments. Thanks

Srikanth Yamani, P.E.
Project Manager
Wilson Engineers
9633 S. 48th St. #290
Phoenix, AZ 85044
Ph: 480-893-8860

From: Todd, Steve M.
Sent: Monday, October 15, 2018 8:18 AM
To: Willgohs, Martin O. <Martin.Willgohs@wilson-engineers.com>; Yamani, Srikanth <srikanth.yamani@wilson-engineers.com>
Subject: FW: NRCI Campus-Sewer Capacities/Inverts and Water Demands

Stephen M. Todd, P.E.
Wilson Engineers
9633 S. 48th St., Suite 290
Phoenix, AZ 85044
480-893-8860 (Office)
480-893-8968 (Fax)
602-882-1732 (Cell)

From: Ema Shqalsi <eshqalsi@hubbardengineering.com>
Sent: Friday, October 12, 2018 1:28 PM
To: Todd, Steve M. <Steve.Todd@wilson-engineers.com>
Subject: NRCI Campus-Sewer Capacities/Inverts and Water Demands

Hi Steve,

We completed our capacity calculations and found that for the NRI Campus demands only, a 12" at 0.35% (City of Scottsdale Master Plan stipulates minimum of 0.3%) would work for the site.
However, including the demands from Lots 2, 3, we calculated a 15" line at 0.27% going South along Miller and an 18" the rest of line to the Hayden/Frontage intersection (Exhibit 3).

With only the demands from NRI Campus, an 18” pipe would give us a flow depth of 6.47in at velocity of about 2.8ft/s at the minimum slope we used, 0.3%, meeting the Scottsdale standards.
I also used our sewer load estimates for Lots 2,3, and 4 as they did not seem too far off from Wilson’s estimates.

With the 12”, we’re hitting the SE corner of Hayden (53.05 ft south of the existing manhole) at an invert of 1594.52.
With the 18”, we have an invert of 1596.20. Does Wilson have an idea yet of what invert they need for their design?

Also, while you are reviewing our sewer calculations (loads and capacities), I also wanted to send over our water demands. We followed the Scottsdale Design Standards and Policies Manual for these calculations, so they are comparatively higher than our sewer.

Please let me know what you think and if the design works with your sewer lift calculations and configurations, or if you have any questions or concerns.

Best,

Ema Shqalsi, E. I. T
Civil Engineer
HUBBARD ENGINEERING
1201 S. Alma School Rd., Suite 12000
Mesa, Arizona 85210
phone 480 892 3313
cell 602 750 1078
fax 480 892 7051
www.hubbardengineering.com

Michael S. Wolf

From: Anderson, Scott L <scan@scottsdaleaz.gov>
Sent: Tuesday, March 26, 2019 4:32 PM
To: Hayes, Eliana; Michael S. Wolf
Cc: Brent Steffenhagen; Yamani, Srikanth; Todd, Steve M.; Bloemberg, Greg
Subject: RE: Cavasson Waterwater Flows

Categories: FYI-Info to keep Handy

Michael,

I have been following you emails with Eliana. At one point last week you mentioned using the loading rate of 2,060 gpapd which came from our *2012 Water Reuse Master Plan*. These numbers are meant to be applied city-wide, over areas much larger that the Cavasson Master Plan, or even the service area of the sewer lift station.

I am much more comfortable with the calculation that Eliana used:

80 gpcpd * 1.7 persons/DU * 31 DU/acre

This is much closer to the design criteria we use for every other sewer lift station in the City.

Please proceed using this calculation for the seven multi-family parcels within Cavasson and the other three multi-family lots within the sewer lift station service area.

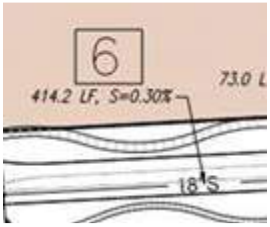
Scott

From: Hayes, Eliana <EHayes@Scottsdaleaz.gov>
Sent: Monday, March 25, 2019 9:27 AM
To: Michael S. Wolf <mwolf@hubbardengineering.com>; Anderson, Scott L <scan@scottsdaleaz.gov>
Cc: Brent Steffenhagen <bsteffenhagen@hubbardengineering.com>; Yamani, Srikanth <srikanth.yamani@wilson-engineers.com>; Todd, Steve M. <Steve.Todd@wilson-engineers.com>; Bloemberg, Greg <GBLO@Scottsdaleaz.gov>
Subject: RE: Cavasson Waterwater Flows

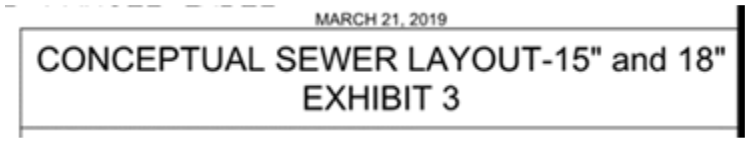
Hello Michael and thank you for added clarification.

The Nationwide waste generation numbers must have changed from those sent over on Mar 20th, based on most recent PDD totals given below.

I concur with 15" capacity analysis. I'm assuming pipe segments 6-11 illustrated as 18" are incorrect + will be corrected in resubmitted master plan:



Also a retitling of exhibit to remove reference to 18":



I have a call in to WR to discuss with them further to make sure we are all on the right page. I'll or they'll follow up accordingly.

Thank you - Eliana

From: Michael S. Wolf <mwolf@hubbardengineering.com>
Sent: Friday, March 22, 2019 9:28 AM
To: Hayes, Eliana <EHayes@Scottsdaleaz.gov>; Anderson, Scott L <scan@scottsdaleaz.gov>
Cc: Brent Steffenhagen <bsteffenhagen@hubbardengineering.com>; Yamani, Srikanth <srikanth.yamani@wilson-engineers.com>; Todd, Steve M. <Steve.Todd@wilson-engineers.com>; Bloemberg, Greg <GBLO@Scottsdaleaz.gov>
Subject: RE: Cavasson Waterwater Flows

Good morning Eliana. I believe I see the difference in the flows we are generating. I put together an exhibit which shows where we applied the sewer loads (attached) along with how I numbered the pipes so that tracing where the flows are coming from is a little easier.. Here is a quick table for the sewer which comes from Legacy, down Miller and down Claret which shows how we routed them:

Street Segment	Sewer Line Segments	Contributing Sewer Areas
Legacy	Legacy	Lot 3, Lot 4, 1C-2, 1C-5
Miller	1,2,3	Lot 3, Lot 4, 1C-2, 1C-5, **+1C-1 +Lot 2**
Cavasson West	4,5,6,7	Lot 3, Lot 4, 1C-2, 1C-5, 1C-1, Lot 2, **+1B-2**
Claret North	8	Lot 3, Lot 4, 1C-2, 1C-5, 1C-1, Lot 2, 1B-2, **+1C-7 +1C-6 +1C-8**
Claret South	9,10,11,12	Lot 3, Lot 4, 1C-2, 1C-5, 1C-1, Lot 2, 1B-2, 1C-7, 1C-6, 1C-8, **+1B-**
Fire Drive West	12,14,15	Lot 3, Lot 4, 1C-2, 1C-5, 1C-1, Lot 2, 1B-2, 1C-7, 1C-6, 1C-8, 1B-1,
Fire Drive East	16,17,18,19->MH-Tie	Lot 3, Lot 4, 1C-2, 1C-5, 1C-1, Lot 2, 1B-2, 1C-7, 1C-6, 1C-8, 1B-1, **1**

If I worked backwards from your numbers right, it looks like 1C-2 and 1C-5 were omitted from your table for contributing down the Miller sewer. There are existing stubs to these parcels which are then conveyed back to the west to Legacy and Miller. We are also sewering 1C-7 and 1C-6 through 1C-8, so they discharge at the intersection of Cavasson and Claret.

As far as our pipe capacity for the line sizing, we are running the 15" sewer at 0.0037 ft/ft. I am coming up with a d/D of 0.66 and a full flow capacity of 2.539 mgd. I marked the discharge location (MH) where Wilson is picking up the sewer, from both the East run and the West run.

Please let me know if this clarifies everything or if we need to discuss. Thank you.

From: Hayes, Eliana <EHayes@Scottsdaleaz.gov>
Sent: Thursday, March 21, 2019 12:47 PM
To: Michael S. Wolf <mwolf@hubbardengineering.com>; Anderson, Scott L <scan@scottsdaleaz.gov>
Cc: Brent Steffenhagen <bsteffenhagen@hubbardengineering.com>; Yamani, Srikanth <srikanth.yamani@wilson-engineers.com>; Todd, Steve M. <Steve.Todd@wilson-engineers.com>; Bloemberg, Greg <GBLO@Scottsdaleaz.gov>
Subject: RE: Cavasson Waterwater Flows

Hello Michael –

Can you please clarify which pipe you are referring to when making the statement:

> Total outflow in new pipe crossing Hayden Road:
> ADD = 661,346 gpd
> PDD = 2,123,229 gpd

The pipe crossing Nationwide parcel into Hayden should only be seeing a PDD of about 1,695,220 (quick math). Your not referring to this new pipe?

Also, can you please clarify which pipe you are referring to when making this statement:

> Please note that the maximum pipe size is still 15", but we are right at the threshold for D/d (0.67) leaving the site.

Again, based on my calculations, these are the following line segment, pipe, sizes that should be constructed by development (taking into account future flows from lots 2, 3, + 4):

SEWER LINE SEGMENTS	SEWER LINE SIZE REQUIRED
1, 2 , 3	15"
4, 5, 6, 7	15"
8, 9, 10	18"
11, 12, 14	18"
16, 17	18"
19,20,21	18"

Please clarify.

Thank you - Eliana

From: Michael S. Wolf <mwolf@hubbardengineering.com>
Sent: Wednesday, March 20, 2019 3:58 AM
To: Hayes, Eliana <EHayes@Scottsdaleaz.gov>; Anderson, Scott L <scan@scottsdaleaz.gov>
Cc: Brent Steffenhagen <bsteffenhagen@hubbardengineering.com>; Yamani, Srikanth <srikanth.yamani@wilson-engineers.com>; Todd, Steve M. <Steve.Todd@wilson-engineers.com>; Bloemberg, Greg <GBLO@Scottsdaleaz.gov>
Subject: RE: Cavasson Waterwater Flows

Eliana, I agree with your assessment and appreciate you running the options with us. We will use the following:
M.F. Unit Flow Rate = 80 gpcpd * 1.7 person/d.u. * 31 d.u./acre = 4,216 gpapd <= Maximize the ADD
Peaking Factor Population = 1.4 persons/d.u. * 23 d.u./acre * acreage <= Minimize the population which Maximizes the Peaking Factor in Harmons.

We will use the ADD, PDD and P.F. as provided by Wilson Eng. and we will use the 1.4 persons/d.u. * 23 d.u./acre * acreage for the upstream population on Lot 3 and 4 when adding up our cumulative population applied to Harmon's equation. Below are the calculation results based on the above criteria. Please note that the maximum pipe size is still 15", but we are right at the threshold for D/d (0.67) leaving the site.

Table 2 - Total Wastewater Demands (GPD) - Based on M.F. using 1.7 persons/d.u. for ADD & 1.4 persons/

Parcel Number	Land Use Designation	Area [sq.ft]	Area [acres]	ADD [gpd]	PDD (ADD*P [gpd]
1A-1	Office- Major	288,410	6.62	7,041.83	18,308.75
1A-2	Multi-Family	106,900	2.45	10,993.12	46,942.60
1A-3	Office- Major	210,817	4.84	5,147.32	13,383.02
1A-4	Office- Major	111,089	2.55	2,712.36	7,052.12
1A-5	Multi-Family	164,129	3.77	16,878.21	56,802.99
1A-6	Garage	203,541	4.67	0.00	0.00
1A-7	Hotel	127,754	2.93	12,417.75	32,286.14
1A-8	Commercial/ Retail	104,393	2.40	2,986.82	7,765.73
1B-1	Office- Major	421,088	9.67	10,281.29	26,731.36
1B-2	Multi-Family	431,364	9.90	44,359.36	149,858.11
1B-3	Garage	170,109	3.91	0.00	0.00
1C-1	Multi-Family	873,411	20.05	89,817.33	306,612.95
1C-2	Office- Major	222,112	5.10	5,423.09	14,100.04
1C-3	Hotel	151,582	3.48	14,733.87	38,308.06
1C-4	Commercial/ Retail	342,879	7.87	9,810.24	25,506.61
1C-5	Office- Major	215,746	4.95	5,267.66	13,695.91
1C-6	Multi-Family	156,694	3.60	16,113.62	68,088.99
1C-7	Multi-Family	191,303	4.39	19,672.63	82,609.95
1C-8	Multi-Family	352,473	8.09	36,246.60	145,752.78
1C-9	Office- Major	57,433	1.32	1,402.28	3,645.93
1C-10	Commercial/ Retail	154,919	3.56	4,432.46	11,524.39
Total				315,738	1,068,976

Total Contributing Wastewater Demands (GPD)-Estimates- per CVL Crossroads East Wastev

Parcel Number	Land Use Designation[1]	Area [sq.ft]	Area [acres]	ADDMM[1] [gpad]	Peak Flow[1] [gpad]	Al [g

Lot 2	Mixed-Use	2,555,866	56.35	3,000	7,800	179
Lot 3	Multi-Family	993,630	22.81	2,060	7,746	46,
Lot 4	Multi-Family	2,516,643	57.77	2,060	7,107	119
Total						**345**

Total outflow in new pipe crossing Hayden Road:
ADD = 661,346 gpd
PDD = 2,123,229 gpd

Please note that our final numbers vary slightly from what you calculated only because the areas for each "parcel" changed slightly during the master planning process. If this looks acceptable I will begin updating all of the text and exhibits in the Master Report. Thank you.

Michael

From: Hayes, Eliana <EHayes@Scottsdaleaz.gov>
Sent: Tuesday, March 19, 2019 4:44 PM
To: Michael S. Wolf <mwolf@hubbardengineering.com>; Anderson, Scott L <scan@scottsdaleaz.gov>
Cc: Brent Steffenhagen <bsteffenhagen@hubbardengineering.com>; Yamani, Srikanth <srikanth.yamani@wilson-engineers.com>; Todd, Steve M. <Steve.Todd@wilson-engineers.com>; Bloemberg, Greg <GBLO@Scottsdaleaz.gov>
Subject: RE: Cavasson Waterwater Flows

Hello Michael –

For comparison, the Hubbard proposed revised sewer demand approach is still less than what it would be if sewer demand were determined based on 80 gallons per capita per day (reduced from 105 gallons per capita per day as stated in DSPM) and 1.4 persons per dwelling unit @ 31DU/acre.

I do not recommend increasing the population for peaking factor equation only as this just reduces sewer demands. In our discussion this morning, I was under the impression that increasing the per dwelling unit count would increase the Average Demand based on a per capita calculation which is not what is proposed, or has been used for this project. Therefore I would only recommend 1.4 persons per dwelling unit for peaking factor calculations based on proposed sewer demand calculations.

I'm still not sure why we are being 'frugal' with sewer demand calculations yet are proposing collection system infrastructure in excess of these sewer demand calculations.

As an fyi, I have run the sewer demand calculations based on 80 gallons per capita per day and 1.7 persons per dwelling unit @ 31 DU/acre (1600 DUs/52 acres) and compared those sewer demands to sewer master plan exhibit 3 proposed pipe sizes and the sizes sufficiently cover this demand, all while following the city's D/d capacity restrictions (MF peaking factor based on all multi-family population):

Table 2 - Total Wastewater Demands (GPD) - Based on 1.7 persons per dwelling unit for ADD + Peaking F						
Parcel Number	Land Use Designation	Area [sq.ft]	Area [acres]	POPULATION	ADD [gpd]	PEAKING FACTOR
1A-1	Office- Major	445,000	10.22	_	10,865.14	
1A-2	Multi-Family	168,960	3.88	204.48	16,358.08	3.46
1A-3	Office- Major	314,500	7.22		7,678.84	

1A-4	Office- Major	164,500	3.78		4,016.44	
1A-5	Multi-Family	238,138	5.47	288.27	23,061.52	3.46
1A-6	Garage	203,541	4.67		0.00	
1A-7	Hotel	29,508	0.68		2,868.20	
1A-8	Commercial/ Retail	47,167	1.08		1,349.51	
1B-1	Office- Major	544,000	12.49		13,282.32	
1B-2	Multi-Family	613,685	14.09	742.54	59,403.44	3.46
1B-3	Garage	170,109	3.91		0.00	
1C-1	Multi-Family	873,411	20.05	1056.64	84,530.80	3.46
1C-2	Office- Major	97,000	2.23		2,368.36	
1C-3	Hotel	17,639	0.40		1,714.55	
1C-4	Commercial/ Retail	92,917	2.13		2,658.49	
1C-5	Office- Major	80,500	1.85		1,965.49	
1C-6	Multi-Family	101,055	2.32	122.26	9,781.12	3.46
1C-7	Multi-Family	146,873	3.37	177.60	14,207.92	3.46
1C-8	Multi-Family	195,752	4.49	236.62	18,929.84	3.46
1C-9	Office- Major	54,500	1.25		1,330.67	
1C-10	Commercial/ Retail	59,916	1.38		1,714.28	
Total					278,085	

3.46

Please let me know what I am missing. As stated in meeting this morning, the lift station design sewer demand can be calculated separately from the collection system calculations.

Thank you - Eliana

From: Michael S. Wolf <mwolf@hubbardengineering.com>
Sent: Tuesday, March 19, 2019 2:41 PM
To: Anderson, Scott L <scan@scottsdaleaz.gov>; Hayes, Eliana <EHayes@Scottsdaleaz.gov>
Cc: Brent Steffenhagen <bsteffenhagen@hubbardengineering.com>; Yamani, Srikanth <srikanth.yamani@wilson-engineers.com>; Todd, Steve M. <Steve.Todd@wilson-engineers.com>; Bloemberg, Greg <GBLO@Scottsdaleaz.gov>
Subject: Cavasson Waterwater Flows

Good afternoon all, in an effort to lock in the sewer loading rates for the Multi-family component of the development, we present the following to get sign-off to move forward.

The Zoning of the M.F. areas; R-5 or 23. D.u./acre, the zoning case stipulates that 1,600 d.u.'s is the maximum for this site.

The site master plan included with the Master Sewer Report currently indicates 52.25 acres designated as M.F. usage. If we calculate an equivalent maximum M.F. acreage based on the R-5 zoning density of 23 du/acre with a maximum of 1,600 d.u.'s, as indicated above, we would have the following:

1,600 d.u. (max) / 23 d.u./acre = 69.57 acres maximum of M.F. usage.

Now if we apply the design unit flow of 2,060 gpapd (Ref. – 2012 Scottsdale Water Reuse Master Plan) to the maximum calculated M.F. acreage -> 2,060 gpad * 69.57 acres = **143,315 gpd**

Converting that back to Cavasson's site specific acreage: 143,315 gpd / 52.25 acres = 2,742.8 gpapd => Use **2,745 gpapd** sewer design unit flow for multi-family use within the Cavasson development.
In the original report we used 2,060 gpapd, now we will use 2,745 gpapd, this is a 25% increase.

For the Multi-family population, instead of using 1.4 persons/d.u. we will use 1.7 persons/d.u. for the peaking flow calculation in Harmon's. This comes right out of Section 7-1.403 of the 2018 Scottsdale DSPM for the low end of Multi-family.

Please let us know if this is agreeable, and we will finalize any changes. Thank you.

Table 2 - Total Wastewater Demands (GPD)

Parcel Number	Land Use Designation	Area [sq.ft]	Area [acres]	ADD [gpd]	PDD (ADD*PF) [gpd]	Total M.F Populatio Contributi [P]
1A-1	Office- Major	288,410	6.62	7,041.83	18,308.75	N/A
1A-2	Multi-Family	106,900	2.45	7,157.52	30,408.27	96
1A-3	Office- Major	210,817	4.84	5,147.32	13,383.02	N/A
1A-4	Office- Major	111,089	2.55	2,712.36	7,052.12	N/A
1A-5	Multi-Family	164,129	3.77	10,989.25	36,543.79	4,082
1A-6	Garage	203,541	4.67	0.00	0.00	N/A
1A-7	Hotel	127,754	2.93	12,417.75	32,286.14	N/A
1A-8	Commercial/ Retail	104,393	2.40	2,986.82	7,765.73	N/A
1B-1	Office- Major	421,088	9.67	10,281.29	26,731.36	N/A
1B-2	Multi-Family	431,364	9.90	28,881.98	97,637.22	3,538
1B-3	Garage	170,109	3.91	0.00	0.00	N/A
1C-1	Multi-Family	873,411	20.05	58,479.26	195,303.82	3,935
1C-2	Office- Major	222,112	5.10	5,423.09	14,100.04	N/A
1C-3	Hotel	151,582	3.48	14,733.87	38,308.06	N/A
1C-4	Commercial/ Retail	342,879	7.87	9,810.24	25,506.61	N/A
1C-5	Office- Major	215,746	4.95	5,267.66	13,695.91	N/A
1C-6	Multi-Family	156,694	3.60	10,491.43	44,063.76	141
1C-7	Multi-Family	191,303	4.39	12,808.67	53,430.73	172
1C-8	Multi-Family	352,473	8.09	23,599.84	93,917.55	488
1C-9	Office- Major	57,433	1.32	1,402.28	3,645.93	N/A
1C-10	Commercial/ Retail	154,919	3.56	4,432.46	11,524.39	N/A
Total				234,065	763,613	

Michael S. Wolf, P.E.
Director of Land Development
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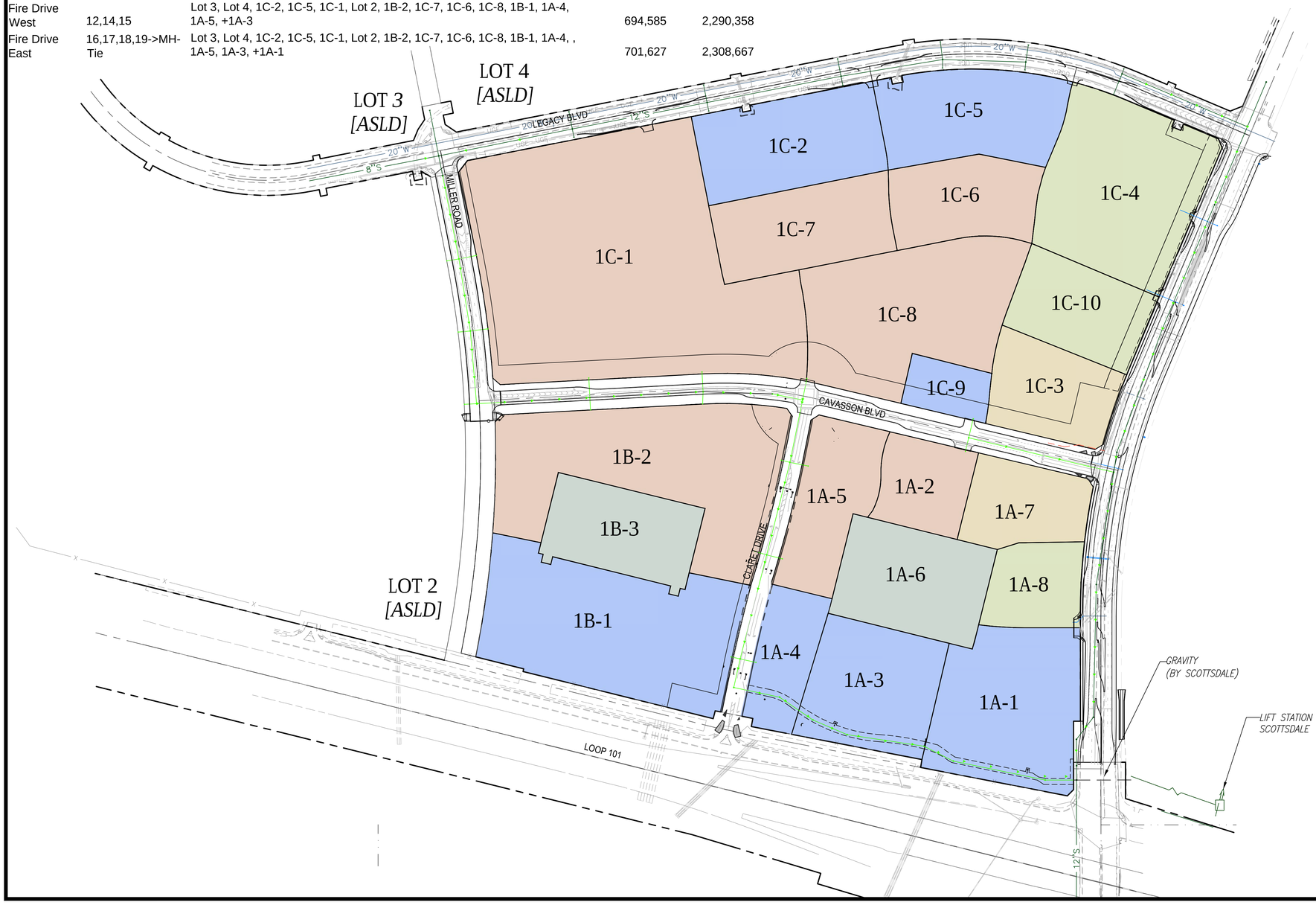
Exhibits
Cavasson

Total Contributing Wastewater Demands (GPD)-Estimates- per CVL Crossroads East Wastewater Plan Update

Parcel Number	Land Use Designation1	Area [sq.ft]	Area [acres]	ADDMM1 [gpad]	Peak Flow1 [gpad]	ADD [gpd]	PDD (ADD*PF) [gpd]
Lot 2	Mixed-Use	2,555,866	56.35	3,000	7,800	179,604	466,970
Lot 3	Multi-Family	993,630	22.81	3,128	11,761	71,352	268,282
Lot 4	Multi-Family	2,516,643	57.77	3,128	10,792	180,718	623,476
Total						**431,673**	**1,358,727**

*1. Land use designation and unit wastewater flows derived from Table 2. Wastewater Generation Unit Factors from the CVL Crossroads East Wastewater Master Plan Update, 2012, Table 2-4 Scottsdale Wastewater Unit Loads – COS 2012 Water Reuse Master Plan Update UPDATED to Use: 80 gal/per*1.7 per/d.u.*23 d.u./ac. [Per Scott Anderson email 03/26/19 for ADD] Peak factor provided by Wilson Engineering*

Street Segment	Sewer Line Segments	Contributing Sewer Areas	ADD CUMM. Total	PDD CUMM. Total
Legacy	Legacy	Lot 3, Lot 4, 1C-2, 1C-5	262,760	919,554
Miller	1,2,3	Lot 3, Lot 4, 1C-2, 1C-5, +1C-1 +Lot 2	532,181	1,693,136
Cavasson West	4,5,6,7	Lot 3, Lot 4, 1C-2, 1C-5, 1C-1, Lot 2, +1B-2	576,540	1,842,994
Claret North	8.0000	Lot 3, Lot 4, 1C-2, 1C-5, 1C-1, Lot 2, 1B-2, +1C-7 +1C-6 +1C-8	648,573	2,139,446
Claret South	9,10,11,12	Lot 3, Lot 4, 1C-2, 1C-5, 1C-1, Lot 2, 1B-2, 1C-7, 1C-6, 1C-8, +1B-1 +1A-4 +1A-5 +1A-2	689,438	2,276,975
Fire Drive West	12,14,15	Lot 3, Lot 4, 1C-2, 1C-5, 1C-1, Lot 2, 1B-2, 1C-7, 1C-6, 1C-8, 1B-1, 1A-4, 1A-5, +1A-3	694,585	2,290,358
Fire Drive East	16,17,18,19->MH-Tie	Lot 3, Lot 4, 1C-2, 1C-5, 1C-1, Lot 2, 1B-2, 1C-7, 1C-6, 1C-8, 1B-1, 1A-4, , 1A-5, 1A-3, +1A-1	701,627	2,308,667



PROPOSED SEWER MANHOLE
EXISTING SEWER MANHOLE
PROPOSED SEWER LINE
EXISTING SEWER LINE
PROPOSED WATER LINE
EXISTING WATER LINE
1A-1 SUB PARCEL LABEL

Sanitary Sewer System Unit Demands and Peaking Factors

Land Use Designation	Unit Flow Rate (Ref.2) [gpapd]	***Peaking Factor (PF)**
Office- Major	1,001	2.60
Hotel	3,985	2.60
Multi-Family	4,216	####
Commercial/ Retail	1,173	2.60

**Peaking factor provided by sewer lift consultant, which was derived and calcualted from empircal data.*

***Peaking factor calculated for Multi-Family using Harmon's Formula; Population = 1.4 people/d.u.*23 d.u./ac utilizing cummulative upstream population*

*MF Unit Flow Rate is based on: 80 gpcpd * 1.7 per/d.u. * 31 d.u./acre = 4,216 gpapd. The Peaking factor was calculated with Harmon's using 1.4 persons/d.u. and 23 d.u. per/acre*

23.0 du/acre

1.4 persons/du

Harmon's Formula:

Peaking Factor= 1+14/(4+P1^0.5)

P1= Population/1,000

Peaking Factor:	2.60	Lot 2
Peaking Factor:	3.76	Lot 3
Peaking Factor:	3.45	Lot 4

Table 2 - Total Wastewater Demands (GPD) - Based on M.F. using 1.7 persons/d.u. for ADD & 1.4 persons/d.u. in Population for Harmons

Parcel Number	Land Use Designation	Area [sq.ft]	Area [acres]	ADD [gpd]	PDD (ADD*PF) [gpd]	Total M.F. Population Contributing [P]	Individual Peaking Factor of all population contributing (PF)
1A-1	Office- Major	288,410	6.62	7,041.83	18,308.75	-	2.60
1A-2	Multi-Family	106,900	2.45	10,993.12	46,942.60	79	4.27
1A-3	Office- Major	210,817	4.84	5,147.32	13,383.02	-	2.60
1A-4	Office- Major	111,089	2.55	2,712.36	7,052.12	-	2.60
1A-5	Multi-Family	164,129	3.77	16,878.21	56,802.99	3,681	3.37
1A-6	Garage	203,541	4.67	0.00	0.00	-	N/A
1A-7	Hotel	127,754	2.93	12,417.75	32,286.14	-	2.60
1A-8	Commercial/ Retail	104,393	2.40	2,986.82	7,765.73	-	2.60
1B-1	Office- Major	421,088	9.67	10,281.29	26,731.36	-	2.60
1B-2	Multi-Family	431,364	9.90	44,359.36	149,858.11	3,559	3.38
1B-3	Garage	170,109	3.91	0.00	0.00	-	N/A
1C-1	Multi-Family	873,411	20.05	89,817.33	306,612.95	3,240	3.41
1C-2	Office- Major	222,112	5.10	5,423.09	14,100.04	-	2.60
1C-3	Hotel	151,582	3.48	14,733.87	38,308.06	-	2.60
1C-4	Commercial/ Retail	342,879	7.87	9,810.24	25,506.61	-	2.60
1C-5	Office- Major	215,746	4.95	5,267.66	13,695.91	-	2.60
1C-6	Multi-Family	156,694	3.60	16,113.62	68,088.99	116	4.23
1C-7	Multi-Family	191,303	4.39	19,672.63	82,609.95	141	4.20
1C-8	Multi-Family	352,473	8.09	36,246.60	145,752.78	402	4.02
1C-9	Office- Major	57,433	1.32	1,402.28	3,645.93	-	2.60
1C-10	Commercial/ Retail	154,919	3.56	4,432.46	11,524.39	-	2.60
Total				315,738	1,068,976		

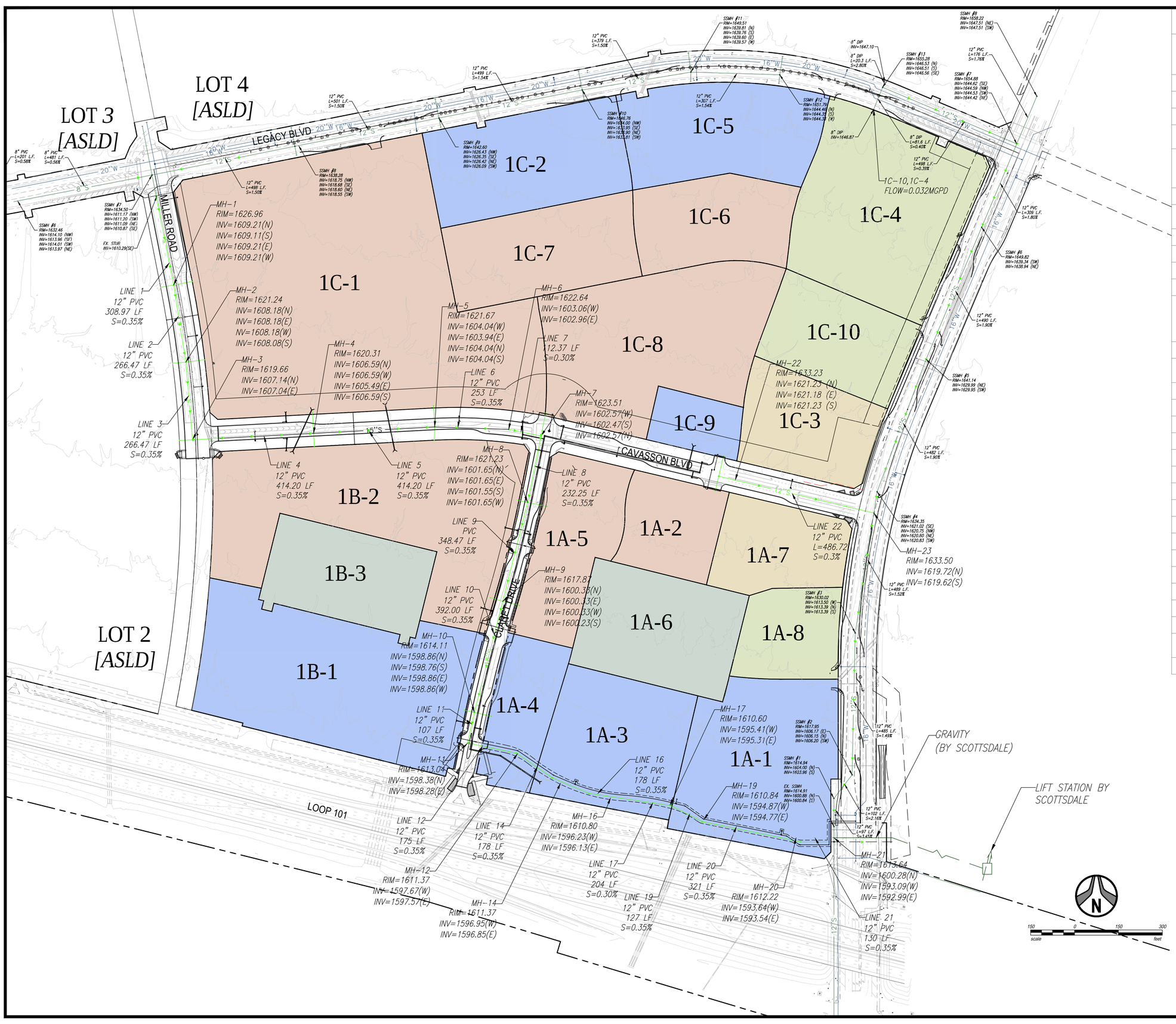
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200 0 200 400
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March 26, 2019

MASTER SEWER LOADS
EXHIBIT 1

HUBBARD ENGINEERING
www.hubbardengineering.com
1201 S. Alma School Rd.
Suite 12000
Mesa, AZ 85210
Ph: 480.892.3313



Parcel Number	Area [sq.ft]	ADD [gpd]	PDD [gpd])	
1C-9	57,433	1,402	3,646	Hayden
1C-3	151,582	14,734	38,308	
1A-7	127,754	12,418	32,286	
1A-8	104,393	2,987	7,766	
Total To MH-22	**441,161**	**31,541**	**82,006**	
1C-4	342,879	9,810	25,507	Legacy
1C-10	154,919	4,432	11,524	
Total to SSMH#13	**497,798**	**14,243**	**37,031**	
1C-2	222,112	5,423	14,100	
1C-5	215,746	5,268	13,696	
1C-7	191,303	19,673	82,610	
1C-6	156,694	16,114	68,089	
Total to SSMH#7	**785,854**	**46,477**	**178,495**	Proposed Line
1C-1	873,411	89,817	306,613	
Total to MH-1	**873,411**	**89,817**	**306,613**	
1B-2	431,364	44,359	149,858	
Total to MH-4	**431,364**	**44,359**	**149,858**	
1C-8	352,473	36,247	145,753	
Total to MH-7	**352,473**	**36,247**	**145,753**	
1A-5	164,129	16,878	56,803	
1A-2	106,900	10,993	46,943	
Total to MH-9	**271,029**	**27,871**	**103,746**	
1B-1	421,088	10,281	26,731	
1A-4	111,089	2,712	7,052	
1A-3	210,817	5,147	13,383	
1A-1	288,410	7,042	18,309	
Total to MH-10	**1,031,404**	**25,183**	**65,475**	
TOTAL		**315,738**	**1,068,976**	

MH–1 PROPOSED SEWER MANHOLE

SSMH 1 EXISTING SEWER MANHOLE

PROPOSED SEWER LINE

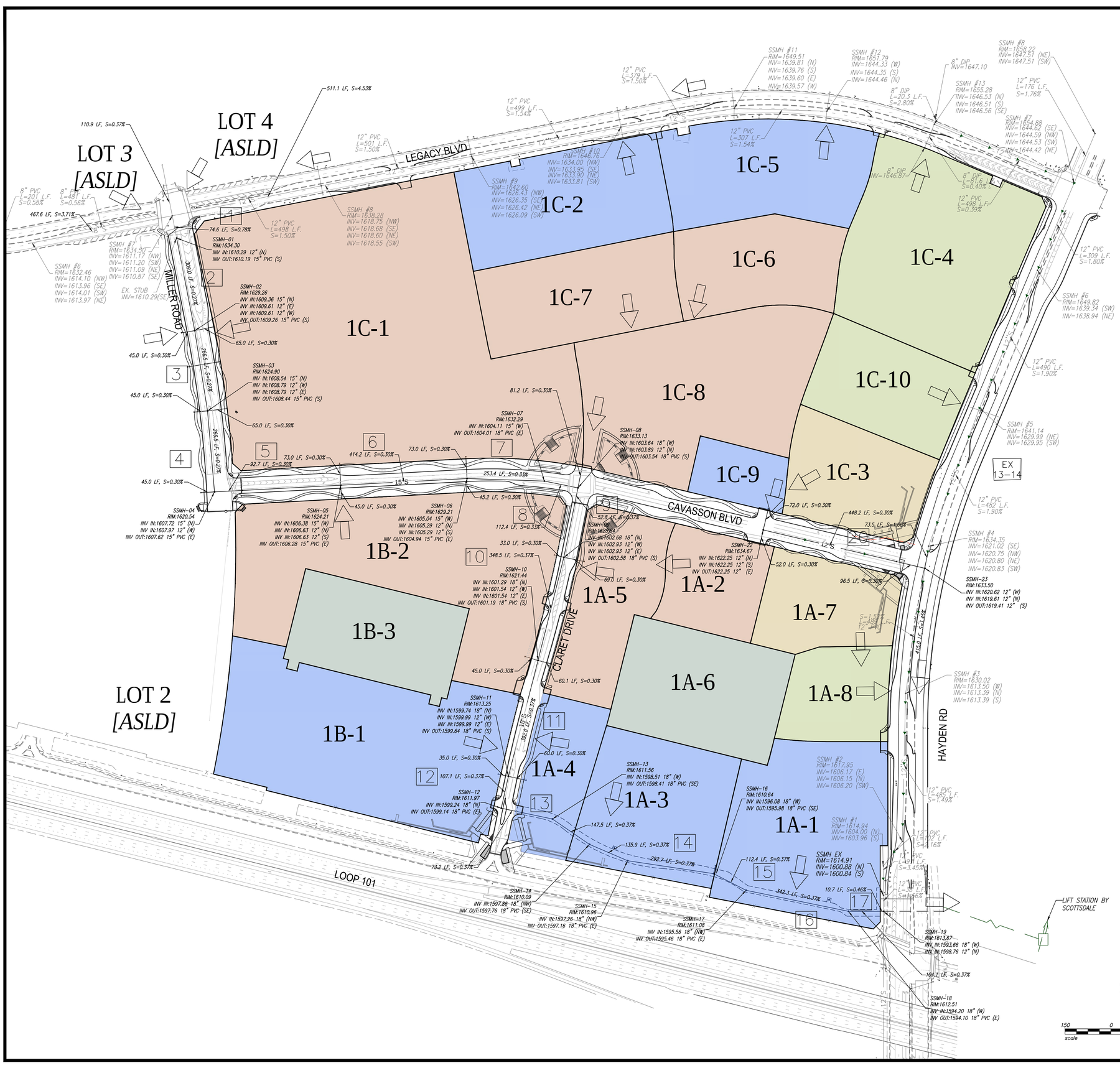
EXISTING SEWER LINE

1A-1 SUB PARCEL LABEL

March 27, 2019

SEWER LAYOUT-12" [CAVASSON ONLY] EXHIBIT 2

HUBBARD ENGINEERING
www.hubbardengineering.com
1201 S. Alma School Rd.
Suite 12000
Mesa, AZ 85210
Ph: 480.892.3313



Parcel Number	ADD [gpd]	PDD [gpd])	
1C-9	1,402	3,646	CAVASSON EAST
1C-3	14,734	38,308	
Total To MH-22	**16,136**	**41,954**	
1C-4	9,810	25,507	HAYDEN NORTH
1C-10	4,432	11,524	
Total to SSMH#5	**14,243**	**37,031**	
1A-7	12,418	32,286	HAYDEN SOUTH
1A-8	2,987	7,766	
Total To SSMH#2	**45,783**	**119,037**	
1C-5	5,268	13,696	LEGACY EAST
1C-2	5,423	14,100	
Lot 4	180,718	623,476	
Lot 3	71,352	268,282	
Total to SSMH#7	**262,760**	**919,554**	
1C-1	89,817	306,613	MILLER
Total to MH-01	**352,577**	**1,226,167**	
Lot 2	179,604	466,970	
Total to MH-03	**532,181**	**1,693,136**	
1B-2	44,359	149,858	CAVASSON WEST
Total to MH-04	**576,540**	**1,842,994**	
1C-7	19,673	82,610	
1C-6	16,114	68,089	
1C-8	36,247	145,753	
Total to MH-08	**648,573**	**2,139,446**	
1A-5	16,878	56,803	CLARET
1A-2	10,993	46,943	
Total to MH-09	**676,444**	**2,243,192**	
1B-1	10,281	26,731	
1A-4	2,712	7,052	
Total to MH-12	**689,438**	**2,276,975**	
1A-3	5,147	13,383	FIRE LANE
Total to MH-15	**694,585**	**2,290,358**	
1A-1	7,042	18,309	
Total to MH-17	**701,627**	**2,308,667**	
Total to MH-19	**747,411**	**2,427,704**	MH-17 + SSMH#2
TOTAL	**747,411**	**2,427,704**	TO EAST SIDE OF HAYDEN

1 SEWER RUN I.D.

SS SSMH-1 PROPOSED SEWER MANHOLE

SSMH #1 EXISTING SEWER MANHOLE

SS PROPOSED SEWER LINE

EXISTING SEWER LINE

1A-1 SUB PARCEL LABEL

MARCH 26, 2019

MASTER SEWER LAYOUT-15" and 18" EXHIBIT 3

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PRELIMINARY DRAINAGE REPORT

Legacy North
NWC of Legacy Blvd. and Miller Rd.
Scottsdale, Arizona



Prepared For:

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291878000
June 2023
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Legacy North

MASTER & PRELIMINARY DRAINAGE REPORT

JUNE 2023

Prepared By:

Kimley»Horn

Kimley»Horn

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1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

The Dinerstein Companies is proposing to construct a multi-family development at the northwest corner of Legacy Boulevard and Miller Road in Scottsdale, Arizona. The project is anticipated to consist of multiple three-story apartment buildings and townhomes with associated parking and infrastructure improvements.

1.2 SITE LOCATION

The proposed Legacy North development encompasses approximately 18.6 net acres in a portion of Section 26, Township 4 North, Range 4 East of the Gila and Salt River Base and Meridian in Maricopa County, Arizona. More specifically, the site is bounded on the west by an APS substation, on the south by Legacy Boulevard and undeveloped desert, on the north by a multi-family complex, and on the east by the future Miller Road alignment and undeveloped desert. The site slopes from the northeast to the southwest at approximately 1.5%. See Appendix A for the Site Location Map and Legal Description. See Figure 1 in Appendix D for a Context Aerial Map.

The adjacent portion of Legacy Boulevard is fully improved, and off-site improvements to Legacy Boulevard will be limited to median modifications and a driveway entrance. The adjacent portion of Miller Road will be constructed with this project. Construction of the adjacent off-site improvements will be completed prior to, or concurrently with, the on-site multi-family development.

1.3 PURPOSE

This Preliminary Drainage Report is intended to satisfy City of Scottsdale requirements. This report provides a description of the current storm water drainage patterns and systems and a description of the required and proposed drainage improvements.

1.4 OBJECTIVES

This report provides a drainage plan for the site that is intended to meet the drainage standards and guidelines of the City of Scottsdale and the Flood Control District of Maricopa County (FCDMC). In particular, this report will demonstrate the following:

1. Any existing off-site flows from the adjacent properties will be handled and conveyed in a way consistent with the current drainage patterns.

2. Permanent drainage facilities, including retention basins and storm drain systems, will have a positive outfall and any detained storm water will be disposed of within 36 hours.

3. Drainage facilities will be designed such that the 100-year post-development flows are collected and conveyed in such a manner so as to not cause damage to buildings and property or exceed pre-development flows.

4. Stormwater retention is provided for the difference between the pre-development and post-development stormwater volume.

5. Building finished floor elevations will be determined in accordance with City of Scottsdale and FEMA Flood Zone Requirements.

2.0 DESCRIPTION OF EXISTING DRAINAGE CONDITIONS AND CHARACTERISTICS

2.1 EXISTING ON-SITE DRAINAGE CONDITIONS

The site currently consists of vacant, undeveloped land with sparse desert vegetation. The site is bounded on the west by an APS substation, on the south by Legacy Boulevard and undeveloped desert, on the north by a multi-family complex, and on the east by the future Miller Road alignment and undeveloped desert. The site slopes from the northeast to the southwest at approximately 1.5%.

Storm water from the site currently flows to the south as sheet flow to two storm drain culverts that direct the storm water under Legacy Boulevard onto the undeveloped land south of the site. Site-generated storm water ultimately reaches the Reach 11 (Dike 2) regional detention facility in the City of Phoenix.

Refer to Figure 2 in Appendix D for the Existing Conditions Exhibit.

2.2 EXISTING OFF-SITE DRAINAGE CONDITIONS

The parcel is affected by regional storm water runoff from area north and east of the site. Off-site storm water from an existing open channel located on the east side of Miller Road to the north of the development outfalls onto the site. This stormwater sheet flows southwest and combines with the site generated storm water to the existing culverts under Legacy Boulevard. Off-site storm water from the undeveloped land to the east flows southwest to a box culvert that directs water from the northeast corner of the Miller Road/Legacy Boulevard intersection to the southwest of said intersection.

The existence of these off-site flows was confirmed by the Crossroads East Drainage Infrastructure Phase 1 drainage report, infrastructure plans, and FLO-2D model prepared by Michael Baker International in March 2020. The FLO-2D model was reviewed and additional cross sections analyzed to determine the magnitude of off-site flows impacting the site. Approximately 101 cfs enters the site from the existing Miller Road corridor and open channel at the northeast corner of the site. This flow spreads and sheet flows southwest towards Legacy boulevard where it concentrates and enters the existing culverts under Legacy Boulevard.

Approximately 14 cfs enters the site at the at the southwest corner from an open channel that runs from west to east along the north side of Legacy Boulevard. This stormwater enters the existing culvert under Legacy Boulevard and continues south.

As mentioned above, the offsite flows that enter the site from the northeast Miller Road channel and southwest Legacy Boulevard Channel concentrate at the south side of the site and cross under Legacy Boulevard via two existing culverts. According to the FLO-2D model, the west culvert conveys 49 cfs and

the east culvert conveys 55 cfs. The stormwater conveyed by these existing culverts continues south and ultimately reaches the Reach 11 (Dike 2) regional detention facility.

Storm water runoff from the adjacent portion of Legacy Boulevard is collected in catch basins that convey storm water directly into the existing storm drain culverts under Legacy Boulevard. Off-site flows from Legacy Boulevard do not affect the site.

Refer to Figure 2 in Appendix D for the Existing Conditions Exhibit. Refer to Appendix C for the FLO-2D model exhibits.

2.4 FEMA FLOOD HAZARD AREAS

The site is located in Flood Zone “AO” according to the Flood Insurance Rate Map 04013C1320L, dated October 16, 2013. Zone “AO” is designated by FEMA as “areas of flood depths of 1 foot (usually sheet flow on sloping terrain) average depths determined for areas of alluvial fan flooding, velocities also determined.” Refer to Appendix B for the FEMA FIRMette map for the site.

A LOMR application has been submitted to the City of Scottsdale to revised the floodplain designation for the site from Zone “AO” to Zone “X” (shaded). Zone “X” is designated by FEMA as “areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas ess than 1 square mile; and areas protected by levees from 1% annual chance flood.”

3.0 PROPOSED DRAINAGE PLAN

3.1 GENERAL DESCRIPTION

In the analysis of the proposed drainage conditions the following items are considered:

- Area Types (concrete pavement, building, and desert landscaping)
- Magnitude of areas
- Slopes
- Storm Drain

3.2 PROPOSED SITE CONDITIONS

The proposed site will be required to detain/retain the pre-development vs. post-development (pre vs. post) or first flush stormwater run-off volume, whichever is greater. The proposed retention system will also be sized to prevent the post-development stormwater flow exiting the site from exceeding the existing condition.

Storm water generated by the site will be conveyed via sheet flow to a series of catch basins and underground storm drains. Storm water storage will be provided by 10-foot diameter CMP underground retention tanks near the south end of the site. The retention tanks will drain to a series of dual-chamber drywells that will dispose of the stormwater within 36 hours.

The proposed storm drain system will be designed in such a way that stormwater in excess of the pre- vs. post- or first flush run-off volume will be conveyed through storm drain pipes at the top of the underground retention tanks and flow to existing culverts under Legacy Boulevard.

Refer to Figure 4 in Appendix D for the Preliminary Grading and Drainage Plans.

3.3 PROPOSED OFF-SITE CONDITIONS

As previously noted, off-site improvements to Miller Road will be completed prior to, or concurrently with, the on-site multi-family development. Stormwater from the existing channel adjacent to Miller Road to the north will be collected and conveyed along the east side of the proposed portion of Miller Road. The storm water will be piped south and west along the Miller Road and Legacy Boulevard frontages, respectively. The proposed conveyance pipe will connect to the existing culverts under Legacy Boulevard and stormwater will then continue south in accordance with it historical condition. The associated drainage improvements will be designed in accordance to the appropriate City standards.Refer to Figure 4 in Appendix D for the Preliminary Grading and Drainage Plans.

3.5 STORM WATER STORAGE REQUIREMENTS

The proposed development will be required to retain the greater of the pre- vs post- or first flush stormwater runoff. Refer to Table 1 below for a comparison of the two scenarios.

Table 1 Pre vs Post Volume and First Flush Retention Comparison

Pre- vs Post			
Cpost-Cpre [ΔC]	**Precipitation Depth [P] (in)**	**Area [A] (sf)**	**Required Volume [(ΔC*P*A)/12] (ft3)**
0.74-0.45=.29	2.38	895,500	51,603

First Flush			
Runoff Coefficient [C]	**Precipitation Depth [P] (in)**	**Area [A] (sf)**	**Required Volume [(C*P*A)/12] (ft3)**
1.0	0.5	895,500	37,313

Refer to Appendix C for the Hydrologic Calculations.

On-site storage will be provided in 10-foot diameter CMP underground storage tanks. The underground retention tanks will be drained in 36 hours or less via dual-chamber drywells. Stormwater runoff in excess of the pre-vs-post storage volume will be collected by the on-site storm drain system and will flow through storm drains at the top of the underground retention tanks to the proposed off-site stormwater conveyance pipe system located along Legacy Boulevard.

3.6 PRE- AND POST-DEVELOPMENT RUNOFF CHARACTERISTICS AT CONCENTRATION POINTS

The existing site consists of vacant desert landscape. Current topography indicates the site drains from the northeast to the southwest. The concentration points for the existing runoff are the two existing culverts under Legacy Boulevard at the south end of the site.

The pre- vs post-development stormwater runoff will be retained in underground retention tanks. Stormwater runoff in excess of the retained volume will flow through storm drains at the top of the underground retention tanks to the proposed storm drain system located along Legacy Boulevard. Similar to the existing condition, the stormwater runoff concentration point for the proposed development will be located at the south end of the site.

Refer to Figure 2 in Appendix D for the Existing Conditions Exhibit.

3.7 ADEQ AZPDES REQUIREMENTS

Prior to construction an executed Notice of Intent (NOI) shall be submitted to Arizona Department of Environmental Quality (ADEQ) in conformance with the Arizona Pollution Discharge Elimination System Permit (AZPDES) permit. The NOI and associated storm water management best management practices will remain active on the site until construction is complete and a Notice of Termination is filed with ADEQ in conformance with AZPDES permit.

3.8 PROJECT PHASING

This project will be constructed in a single phase.

4.0 DATA ANALYSIS METHODS

4.1 HYDROLOGIC PROCEDURES, PARAMETER SELECTION, AND ASSUMPTIONS

Hydrologic calculations for the site were performed using the rational equation in the FCDMC Drainage Design Manual Volume I, which is limited to drainage areas of up to 160 acres.

For analysis of the development, the site was sub-divided into 174 sub-basins consisting of pavement, landscaping, and building areas. Figure 3 in Appendix D identifies the drainage sub-basins and concentration points.

4.2 HYDRAULIC PROCEDURES, METHODS, PARAMETER SELECTION, AND ASSUMPTIONS

All flows for proposed conditions will be determined using the rational method as outlined by the Drainage Design Manual by Maricopa County Flood Control District. Due to the small nature of the watersheds for the individual sub-basins, a minimum time of concentration of five minutes will be assumed. All drainage basins will assume a runoff coefficient of 0.95 with the exception of the landscape sub-basins, which will utilize a runoff coefficient of 0.45 per the DS&PM.

The following criteria was used to size the proposed pipes for on-site storm water conveyance:

- A maximum allowable 100-year ponding depth of six inches above the catch basin grate.
- A minimum of 12 inches of freeboard between the 100-year ponding depth and the building finish floor elevation.
- The tailwater condition for the 100-year event will be assumed to be the surface basin high water or pipe crown at the pipe connection location, whichever is greater.
- The 10-year tailwater condition will be assumed to be free outfall.

The software program StormCAD, by Bentley Systems, was used for the hydraulic modeling. Refer to Appendix C for the 10-year and 100-year model results.

Storm drain catch basins will be sized using Equation 3.21 from the Drainage Design Manual for Maricopa County, Hydraulics. A 50% clogging factor will be applied in the analysis. Catch basin analysis will be provided with the final drainage report.

See Appendix C for sizing calculations for the underground storage tanks.

4.3 STORM WATER STORAGE CALCULATION METHODS AND ASSUMPTIONS

As previously noted, the proposed site will be required to retain the pre- vs- post stormwater runoff volume. Underground 10-foot diameter retention tanks will be used to store the site-generated stormwater. The

required pre- vs post- volume is calculated based on Section 4-1.201.C.1.b of the City of Scottsdale 2018 Design Standards & Policies Manual (DS&PM):

$$V = (\Delta C * P * A)/12$$

Where: V = Required first flush volume (cubic feet)

ΔC = Weighted runoff coefficient for the proposed development – weighted runoff coefficient for the existing development

P = Precipitation depth of 2.38 inches

A = Contributing area (square feet)

5.0 CONCLUSION

5.1 OVERALL PROJECT

Based on the results of this Preliminary Drainage Report, the following can be concluded:

- Off-site stormwater that impacts the proposed site will be collected and conveyed in a way consistent with pre-development conditions.
- Treatment for the storm water first flush will be provided by 10-foot diameter CMP underground retention tanks.
- Off-site improvements to adjacent portions of Miller Road will include drainage facilities that will route off-site flows around the site.
- Based on the current Flood Insurance Rate Map (FIRM), the site is located in the Zone “AO”. A LOMR is anticipated to be approved that will revise the site to Zone “X”.
- Per Maricopa County Drainage requirements, the finished floor elevation for the proposed buildings will be 1-ft above the 100 year off-site flow and above the ultimate outfall of the site.

This report is intended to provide a level of assurance that the site will adhere to all appropriate reviewing agency guidelines with respect to drainage and flood protection.

7.0 REFERENCES

1. City of Scottsdale, *Design Standards and Policies Manual, Chapter 4: Grading and Drainage,* January 2018.

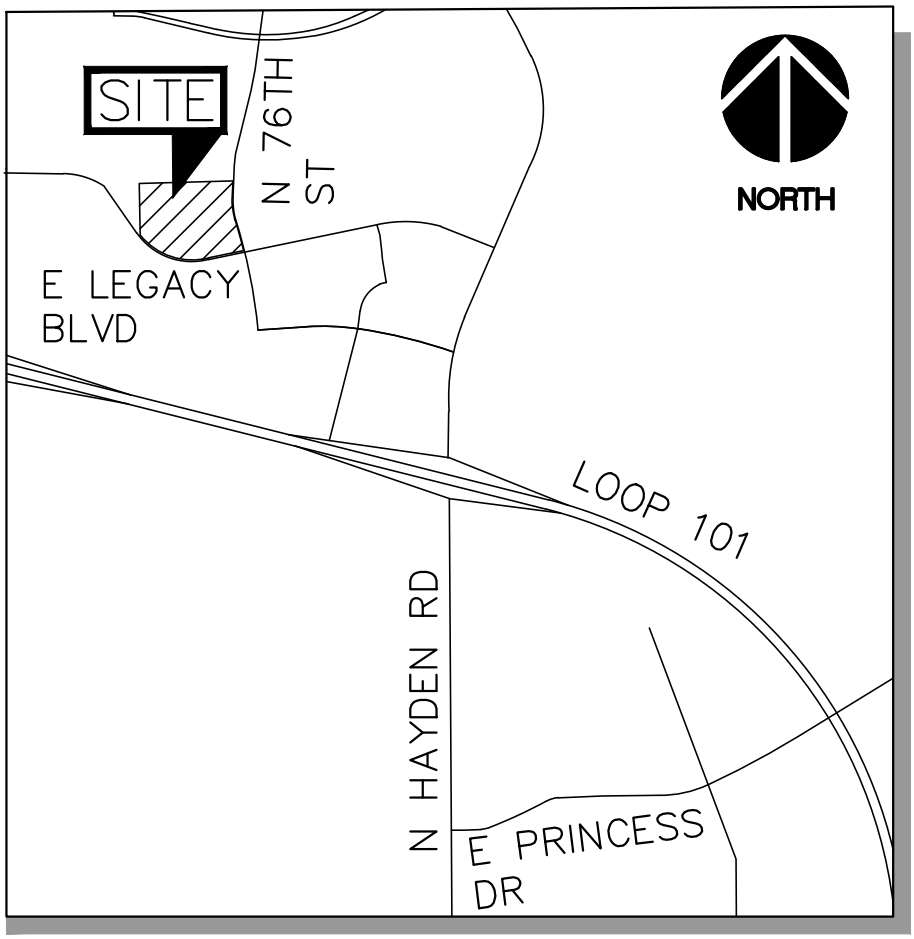
2. Michael Baker International, *Drainage Design Report for Crossroads East Drainage Infrastructure Phase 1,* March, 2020.

3. Federal Emergency Management Agency (FEMA), *Flood Insurance Rate Map (FIRM) of Maricopa County, Arizona and Incorporated Areas, Panel 1320 of 4425, Map Number 0413C1320L*, October 16, 2013.

4. Flood Control District of Maricopa County (FCDMC), *Drainage Design Manual for Maricopa County, Hydrology Volume, February*, 2008.

5. Flood Control District of Maricopa County (FCDMC), *Drainage Design Manual for Maricopa County, Hydraulics Volume,* January, 1996.

Appendix A – Site Location Map and Legal Descriptions



VICINITY MAP

SCOTTSDALE, AZ

N.T.S.

VICINITY MAP

N.T.S.

NORTH

Kimley»Horn

K:\PHX_Civil\291878000 - Legacy & Miller\CADD\Exhibits\Vicinity Map.dwg Jun 22, 2023 Max.Halpert

ALL THAT CERTAIN REAL PROPERTY IN THE COUNTY OF MARICOPA, STATE OF ARIZONA, DESCRIBED AS FOLLOWS:
THAT PORTION OF SECTION 26, TOWNSHIP 4 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER BASE
AND MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE CENTER OF SAID SECTION 26, BEING MARKED BY AN ADOT HIGHWAY DIVISION
ALUMINIUM CAP STAMPED LS16870, FROM WHICH THE EAST QUARTER CORNER OF SAID SECTION 26, BEING
MARKED BY THE GLO BRASS CAP STAMPED 1914 BEARS SOUTH 89 DEGREES 57 MINUTES 50 SECONDS
EAST, A DISTANCE OF 2641.99 FEET;

THENCE ALONG THE EAST–WEST MID–SECTION LINE, SOUTH 89 DEGREES 57 MINUTES 50 SECONDS EAST, A
DISTANCE OF 194.70 FEET TO A POINT ON THE CENTER LINE OF MILLER ROAD AS DEDICATED ON STATE
RIGHT OF WAY #16–119941 AND THE POINT OF BEGINNING;

THENCE ALONG SAID CENTER LINE OF MILLER ROAD, SOUTH 11 DEGREES 04 MINUTES 34 SECONDS EAST
182.59 FEET TO AN ANGLE POINT ON THE CENTER LINE OF SAID LEGACY ROAD;

THENCE DEPARTING SAID CENTER LINE OF MILLER ROAD ALONG THE CENTER LINE OF LEGACY BOULEVARD
AS DEDICATED IN STATE RIGHT OF WAY #16–119941, SOUTH 78 DEGREES 54 MINUTES 18 SECONDS WEST, A
DISTANCE OF 488.86 FEET TO THE BEGINNING OF A TANGENT CURVE TO THE RIGHT;

SAID CURVE BEING CONCAVE NORTHEASTERLY THROUGH AN ANGLE OF 45 DEGREES 06 MINUTES 31
SECONDS, HAVING A RADIUS OF 800.00 FEET, AN ARC LENGTH OF 629.84 FEET TO A POINT OF
INTERSECTION WITH A NON–TANGENTIAL LINE;

THENCE DEPARTING SAID CENTER LINE OF LEGACY BOULEVARD AS DEDICATED IN STATE RIGHT OF WAY
#16–119941, NORTH 00 DEGREES 02 MINUTES 30 SECONDS EAST FOR A DISTANCE OF 410.32 FEET TO A
POINT;

THENCE NORTH 00 DEGREES 00 MINUTES 44 SECONDS EAST, A DISTANCE OF 365.64 FEET TO A POINT;

THENCE NORTH 87 DEGREES 27 MINUTES 38 SECONDS EAST, A DISTANCE OF 948.33 FEET TO THE CENTER
LINE OF MILLER ROAD AS DEDICATED IN STATE RIGHT OF WAY #16–119941 AND A NON–TANGENTIAL CURVE
TO THE LEFT THROUGH AN ANGLE OF 11 DEGREES 21 MINUTES 57 SECONDS, HAVING A RADIUS OF 1610.00
FEET AND AN ARC LENGTH OF 319.38 FEET TO A POINT OF TANGENCY AND THE CENTER LINE OF MILLER
ROAD AS DEDICATED IN STATE RIGHT OF WAY #16–119941;

THENCE SOUTH 11 DEGREES 04 MINUTES 34 SECONDS EAST A DISTANCE OF 355.82 FEET TO THE POINT OF BEGINNING.

SAID PARCEL CONTAINS 895,495 SQUARE FEET, OR 20.5577 ACRES MORE OR LESS.

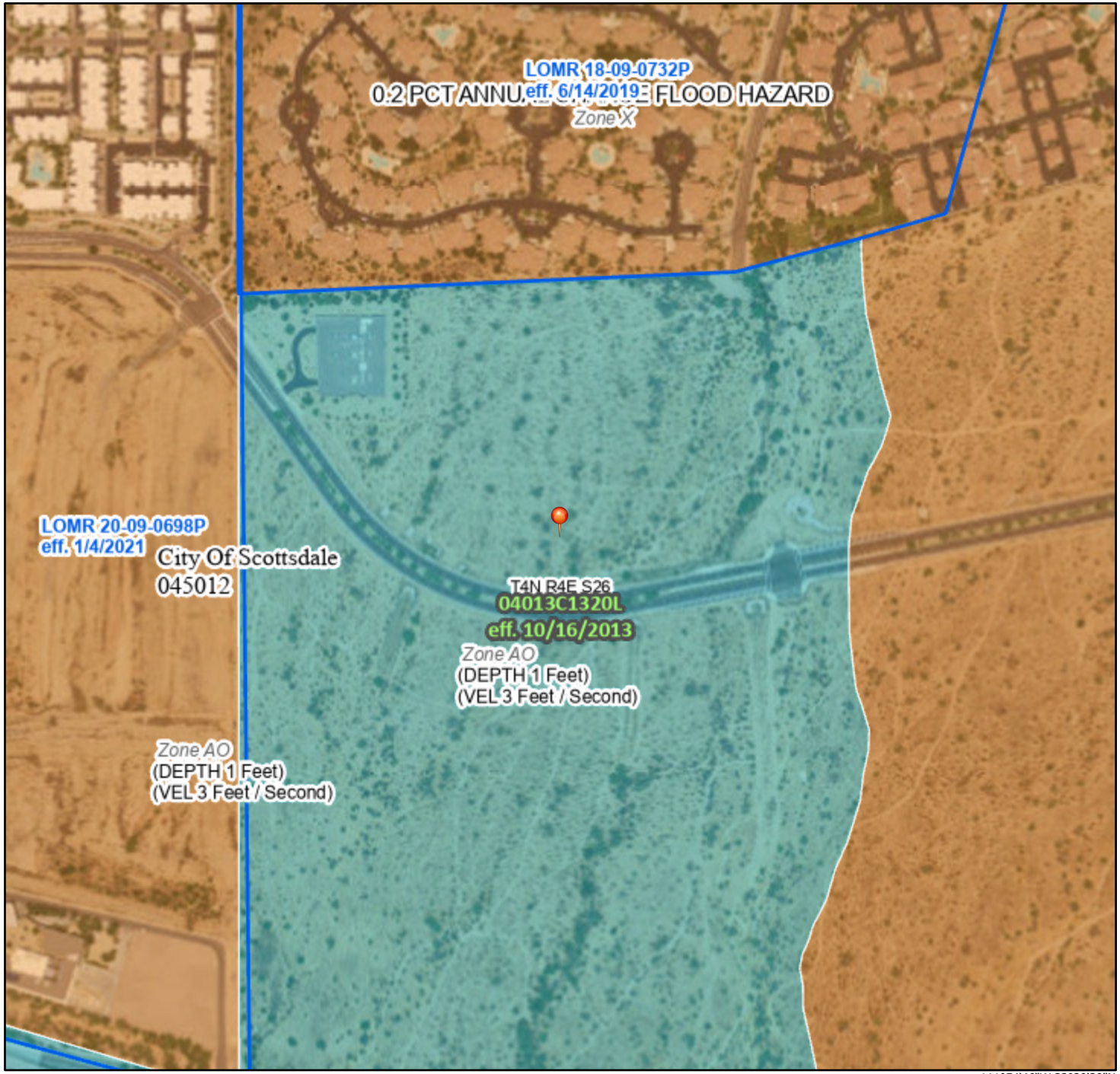
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Appendix B – FEMA Flood Insurance Rate Map (FIRM)

National Flood Hazard Layer FIRMette

FEMA

111°55'24"W 33°39'59"N



111°54'46"W 33°39'29"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

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

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

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 4/10/2023 at 11:30 AM 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 FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix C – Hydrologic/Hydraulic Calculations

Overall Retention Summary - NWC Legacy Boulevard and Miller Road											
Drainage Area	Land Use	Area [A]		Pre-Exist. Runoff Coefficient, [C_{PRE}]	Post-Dev. Runoff Coefficient, [C_{POST}]	Runoff Coefficient [$C=C_{POST}-C_{PRE}$]	Precipitation Depth [P]	Required Storage (V_{REQ} = CPA/12)		Retention Basin	Catch Basin
		sf	ac				in	cf	ac-ft		
173	Building	3117.86	0.072	0.45	0.95	0.50	2.38	309	0.007	B	CBB11
174	Building	5695.09	0.131	0.45	0.95	0.50	2.38	565	0.013	B	CBB4
175	Building	3728.21	0.086	0.45	0.95	0.50	2.38	370	0.008	B	CBB8
176	Building	183.76	0.004	0.45	0.95	0.50	2.38	18	0.000	C	CBC8
177	Building	0	0.000	0.45	0.95	0.50	2.38	0	0.000	-	-
178	Pavement	5664.63	0.130	0.45	0.95	0.50	2.38	562	0.013	C	CBC8
179	Landscaping	168.76	0.004	0.45	0.45	0.00	2.38	0	0.000	B	CBB2
180	Landscaping	329.62	0.008	0.45	0.45	0.00	2.38	0	0.000	B	CBB2
181	Building	6353.57	0.146	0.45	0.95	0.50	2.38	630	0.014	C	CBB2
182	Building	8583.77	0.197	0.45	0.95	0.50	2.38	851	0.020	C	CBC10
183	Building	8582.66	0.197	0.45	0.95	0.50	2.38	851	0.020	C	CBC15
184	Landscaping	5686.03	0.131	0.45	0.45	0.00	2.38	0	0.000	C	CBC4
185	Building	8593.69	0.197	0.45	0.95	0.50	2.38	852	0.020	C	CBC14
186	Pavement	1836.6	0.042	0.45	0.95	0.50	2.38	182	0.004	C	CBC15
187	Building	8582.66	0.197	0.45	0.95	0.50	2.38	851	0.020	C	CBC3
188	Building	8582.69	0.197	0.45	0.95	0.50	2.38	851	0.020	C	CBC3
189	Landscaping	630.75	0.014	0.45	0.45	0.00	2.38	0	0.000	B	CBB14
190	Landscaping	924.19	0.021	0.45	0.45	0.00	2.38	0	0.000	A	CBA6
191	Building	1709.24	0.039	0.45	0.95	0.50	2.38	169	0.004	A	CBA5
192	Building	3314.51	0.076	0.45	0.95	0.50	2.38	329	0.008	B	CBB4
193	Landscaping	2184.31	0.050	0.45	0.45	0.00	2.38	0	0.000	B	CBB3
194	Landscaping	6019.34	0.138	0.45	0.45	0.00	2.38	0	0.000	B	CBB3
195	Landscaping	5951.25	0.137	0.45	0.45	0.00	2.38	0	0.000	B	CBB2
196	Building	8582.61	0.197	0.45	0.95	0.50	2.38	851	0.020	B	CBB2
197	Building	8582.66	0.197	0.45	0.95	0.50	2.38	851	0.020	B	CBB3
198	Landscaping	978.21	0.022	0.45	0.45	0.00	2.38	0	0.000	B	CBB1
199	Pavement	1939.49	0.045	0.45	0.95	0.50	2.38	192	0.004	B	CBB1
200	Landscaping	1148.16	0.026	0.45	0.45	0.00	2.38	0	0.000	B	CBB3
201	Building	1718.77	0.039	0.45	0.95	0.50	2.38	170	0.004	A	CBA1
202	Landscaping	8582.66	0.197	0.45	0.45	0.00	2.38	0	0.000	A	CBA1
203	Landscaping	1032.36	0.024	0.45	0.45	0.00	2.38	0	0.000	A	CBA1
204	Landscaping	158.14	0.004	0.45	0.45	0.00	2.38	0	0.000	A	CBA2
205	Landscaping	164.9	0.004	0.45	0.45	0.00	2.38	0	0.000	A	CBA2
206	Building	4225.86	0.097	0.45	0.95	0.50	2.38	419	0.010	A	CBA12
207	Landscaping	3895.49	0.089	0.45	0.45	0.00	2.38	0	0.000	A	CBA12
208	Building	4222.16	0.097	0.45	0.95	0.50	2.38	419	0.010	A	CBA12
209	Building	4225.47	0.097	0.45	0.95	0.50	2.38	419	0.010	A	CBA12
210	Landscaping	113.29	0.003	0.45	0.45	0.00	2.38	0	0.000	A	CBA12
211	Building	4222	0.097	0.45	0.95	0.50	2.38	419	0.010	A	CBA12
212	Landscaping	865.69	0.020	0.45	0.45	0.00	2.38	0	0.000	A	CBA12
213	Landscaping	8302.57	0.191	0.45	0.45	0.00	2.38	0	0.000	B	CBA12
214	Landscaping	685.37	0.016	0.45	0.45	0.00	2.38	0	0.000	A	CBA12
215	Building	4222.1	0.097	0.45	0.95	0.50	2.38	419	0.010	A	CBA9
216	Landscaping	3908.76	0.090	0.45	0.45	0.00	2.38	0	0.000	A	CBA9
217	Building	4225.67	0.097	0.45	0.95	0.50	2.38	419	0.010	A	CBA9
218	Building	4222.03	0.097	0.45	0.95	0.50	2.38	419	0.010	A	CBA9
219	Landscaping	3875.08	0.089	0.45	0.45	0.00	2.38	0	0.000	A	CBA9
220	Building	4218.52	0.097	0.45	0.95	0.50	2.38	418	0.010	A	CBA9
221	Building	4222.15	0.097	0.45	0.95	0.50	2.38	419	0.010	A	CBA9
222	Building	3118.13	0.072	0.45	0.95	0.50	2.38	309	0.007	A	CBA9
223	Building	4222.36	0.097	0.45	0.95	0.50	2.38	419	0.010	A	CBA9
224	Landscaping	1733.82	0.040	0.45	0.45	0.00	2.38	0	0.000	B	CBB12
225	Landscaping	4470.96	0.103	0.45	0.45	0.00	2.38	0	0.000	B	CBB12
226	Building	4222.35	0.097	0.45	0.95	0.50	2.38	419	0.010	B	CBB12
227	Building	4225.06	0.097	0.45	0.95	0.50	2.38	419	0.010	B	CBB12
228	Building	3117.86	0.072	0.45	0.95	0.50	2.38	309	0.007	A	CBA11
229	Building	3117.86	0.072	0.45	0.95	0.50	2.38	309	0.007	A	CBA11
230	Pavement	6590.8	0.151	0.45	0.95	0.50	2.38	654	0.015	A	CBA6
231	Landscaping	4613.46	0.106	0.45	0.45	0.00	2.38	0	0.000	A	CBA7
232	Building	3117.86	0.072	0.45	0.95	0.50	2.38	309	0.007	A	CBA7
233	Building	3117.86	0.072	0.45	0.95	0.50	2.38	309	0.007	B	CBB13
234	Building	3117.86	0.072	0.45	0.95	0.50	2.38	309	0.007	B	CBB13
235	Building	3117.86	0.072	0.45	0.95	0.50	2.38	309	0.007	B	CBB11
236	Building	3117.86	0.072	0.45	0.95	0.50	2.38	309	0.007	B	CBB10
237	Building	2036.5	0.047	0.45	0.95	0.50	2.38	202	0.005	B	CBB10
238	Building	3117.86	0.072	0.45	0.95	0.50	2.38	309	0.007	B	CBB10
239	Landscaping	4098.08	0.094	0.45	0.45	0.00	2.38	0	0.000	B	CBB8
240	Building	3117.86	0.072	0.45	0.95	0.50	2.38	309	0.007	A	CBA10
241	Landscaping	3587.78	0.082	0.45	0.45	0.00	2.38	0	0.000	A	CBA8
242	Building	3117.86	0.072	0.45	0.95	0.50	2.38	309	0.007	A	CBA10
243	Landscaping	8060.62	0.185	0.45	0.45	0.00	2.38	0	0.000	B	CBB7
244	Landscaping	1817.84	0.042	0.45	0.45	0.00	2.38	0	0.000	A	CBA9
245	Pavement	2529.31	0.058	0.45	0.95	0.50	2.38	251	0.006	B	CBB10
246	Landscaping	11645.13	0.267	0.45	0.45	0.00	2.38	0	0.000	B	CBB9
247	Landscaping	120.61	0.003	0.45	0.45	0.00	2.38	0	0.000	A	CBA12
248	Landscaping	1822.87	0.042	0.45	0.45	0.00	2.38	0	0.000	A	CBA12
249	Pavement	2529.29	0.058	0.45	0.95	0.50	2.38	251	0.006	B	CBB13
250	Landscaping	261.33	0.006	0.45	0.45	0.00	2.38	0	0.000	A	CBA5

Drainage Area	Land Use	Area [A]		Pre-Exist. Runoff Coefficient, [C_{PRE}]	Post-Dev. Runoff Coefficient, [C_{POST}]	Runoff Coefficient [$C=C_{POST}-C_{PRE}$]	Precipitation Depth [P]	Required Storage (V_{REQ} = CPA/12)		Retention Basin	Catch Basin
		sf	ac				in	cf	ac-ft		
251	Landscaping	7838.21	0.180	0.45	0.45	0.00	2.38	0	0.000	A	CBA2
252	Landscaping	3176.38	0.073	0.45	0.45	0.00	2.38	0	0.000	A	CBA1
253	Landscaping	3806.98	0.087	0.45	0.45	0.00	2.38	0	0.000	A	CBA1
254	Building	8607.66	0.198	0.45	0.95	0.50	2.38	854	0.020	A	CBA8
255	Landscaping	1438.1	0.033	0.45	0.45	0.00	2.38	0	0.000	A	CBA8
256	Building	8607.66	0.198	0.45	0.95	0.50	2.38	854	0.020	B	CBB7
257	Landscaping	202.75	0.005	0.45	0.45	0.00	2.38	0	0.000	B	CBB5
258	Landscaping	54.44	0.001	0.45	0.45	0.00	2.38	0	0.000	B	CBB4
259	Pavement	1921.43	0.044	0.45	0.95	0.50	2.38	191	0.004	A	-
260	Pavement	1896.99	0.044	0.45	0.95	0.50	2.38	188	0.004	A	-
261	Landscaping	257.19	0.006	0.45	0.45	0.00	2.38	0	0.000	A	CBA19
262	Building	17471.52	0.401	0.45	0.95	0.50	2.38	1,733	0.040	A	CBB4
263	Landscaping	261.33	0.006	0.45	0.45	0.00	2.38	0	0.000	A	CBA19
264	Building	17501.5	0.402	0.45	0.95	0.50	2.38	1,736	0.040	A	CBA2
265	Pavement	6358.65	0.146	0.45	0.95	0.50	2.38	631	0.014	A	CBA1
266	Landscaping	1882.44	0.043	0.45	0.45	0.00	2.38	0	0.000	B	CBB20
267	Landscaping	1883.75	0.043	0.45	0.45	0.00	2.38	0	0.000	A	CBA15
268	Landscaping	1343.89	0.031	0.45	0.45	0.00	2.38	0	0.000	A	CBA3
269	Landscaping	1885.66	0.043	0.45	0.45	0.00	2.38	0	0.000	B	CBB19
270	Landscaping	1895.85	0.044	0.45	0.45	0.00	2.38	0	0.000	A	CBA13
271	Landscaping	5267.27	0.121	0.45	0.45	0.00	2.38	0	0.000	A	CBA3
272	Landscaping	1882.31	0.043	0.45	0.45	0.00	2.38	0	0.000	A	CBB18
273	Landscaping	1898.13	0.044	0.45	0.45	0.00	2.38	0	0.000	A	CBA14
274	Landscaping	15105.19	0.347	0.45	0.45	0.00	2.38	0	0.000	-	CBB15
275	Landscaping	13464.02	0.309	0.45	0.45	0.00	2.38	0	0.000	C	CBC15
276	Landscaping	1885.42	0.043	0.45	0.45	0.00	2.38	0	0.000	B	CBB17
277	Landscaping	2964.96	0.068	0.45	0.45	0.00	2.38	0	0.000	A	OS
278	Pavement	15051.04	0.346	0.45	0.95	0.50	2.38	1,493	0.034	C	CBC2
279	Landscaping	7747	0.178	0.45	0.45	0.00	2.38	0	0.000	C	CBB14
280	Landscaping	1714.6	0.039	0.45	0.45	0.00	2.38	0	0.000	B	CBB16
281	Pavement	7193.59	0.165	0.45	0.95	0.50	2.38	713	0.016	A	OS
282	Pavement	26816.32	0.616	0.45	0.95	0.50	2.38	2,659	0.061	OS	OS
283	Pavement	1614.08	0.037	0.45	0.95	0.50	2.38	160	0.004	OS	OS
284	Landscaping	4508.79	0.104	0.45	0.45	0.00	2.38	0	0.000	B	CBA18
285	Landscaping	1318.65	0.030	0.45	0.45	0.00	2.38	0	0.000	A	OS
286	Landscaping	10283.13	0.236	0.45	0.45	0.00	2.38	0	0.000	B	CBB14
287	Landscaping	1882.06	0.043	0.45	0.45	0.00	2.38	0	0.000	A	CBA17
288	Landscaping	1481.57	0.034	0.45	0.45	0.00	2.38	0	0.000	A	OS
289	Landscaping	1717.87	0.039	0.45	0.45	0.00	2.38	0	0.000	B	CBB21
290	Landscaping	1863.65	0.043	0.45	0.45	0.00	2.38	0	0.000	A	CBA17
291	Landscaping	1487	0.034	0.45	0.45	0.00	2.38	0	0.000	A	OS
292	Pavement	1825.2	0.042	0.45	0.95	0.50	2.38	181	0.004	C	CBC3
293	Pavement	2256.94	0.052	0.45	0.95	0.50	2.38	224	0.005	C	CBC1
294	Pavement	9926.62	0.228	0.45	0.95	0.50	2.38	984	0.023	C	CBC14
295	Landscaping	1752.27	0.040	0.45	0.45	0.00	2.38	0	0.000	C	CBC3
296	Landscaping	1843.15	0.042	0.45	0.45	0.00	2.38	0	0.000	C	CBC9
297	Pavement	10119.02	0.232	0.45	0.95	0.50	2.38	1,003	0.023	A	CBA2
298	Pavement	17536.07	0.403	0.45	0.95	0.50	2.38	1,739	0.040	B	CBB3
299	Landscaping	825.67	0.019	0.45	0.45	0.00	2.38	0	0.000	B	CBB1
300	Pavement	6910.43	0.159	0.45	0.95	0.50	2.38	685	0.016	B	CBB5
301	Pavement	7625	0.175	0.45	0.95	0.50	2.38	756	0.017	A	CBA20
302	Landscaping	563.38	0.013	0.45	0.45	0.00	2.38	0	0.000	A	CBA20
303	Landscaping	998.44	0.023	0.45	0.45	0.00	2.38	0	0.000	B	CBB5
304	Pavement	2505.16	0.058	0.45	0.95	0.50	2.38	248	0.006	A	CBA3
305	Pavement	3345.88	0.077	0.45	0.95	0.50	2.38	332	0.008	A	CBA1
306	Pavement	3710.74	0.085	0.45	0.95	0.50	2.38	368	0.008	A	CBA4
307	Pavement	2190.96	0.050	0.45	0.95	0.50	2.38	217	0.005	B	CBB5
308	Pavement	6584.56	0.151	0.45	0.95	0.50	2.38	653	0.015	B	CBB5
309	Landscaping	3174.16	0.073	0.45	0.45	0.00	2.38	0	0.000	B	CBB5
310	Pavement	8218.56	0.189	0.45	0.95	0.50	2.38	815	0.019	B	CBB4
311	Landscaping	1341.64	0.031	0.45	0.45	0.00	2.38	0	0.000	A	CBA5
312	Pavement	8297.89	0.190	0.45	0.95	0.50	2.38	823	0.019	A	CBA5
313	Landscaping	1066.11	0.024	0.45	0.45	0.00	2.38	0	0.000	A	CBA19
314	Pavement	8275.37	0.190	0.45	0.95	0.50	2.38	821	0.019	A	CBA19
315	Pavement	8109.44	0.186	0.45	0.95	0.50	2.38	804	0.018	B	CBB12
316	Pavement	2528.15	0.058	0.45	0.95	0.50	2.38	251	0.006	B	CBB11
317	Pavement	2529.37	0.058	0.45	0.95	0.50	2.38	251	0.006	A	CBA11
318	Pavement	2529.43	0.058	0.45	0.95	0.50	2.38	251	0.006	A	CBA10
319	Pavement	22790.69	0.523	0.45	0.95	0.50	2.38	2,260	0.052	A	CBA9
320	Landscaping	1850.07	0.042	0.45	0.45	0.00	2.38	0	0.000	A	CBA9
321	Building	17991.25	0.413	0.45	0.95	0.50	2.38	1,784	0.041	C	CBC6
322	Pavement	5570.21	0.128	0.45	0.95	0.50	2.38	552	0.013	C	CBC13
323	Landscaping	935.85	0.021	0.45	0.45	0.00	2.38	0	0.000	C	CBC14
324	Landscaping	1198.91	0.028	0.45	0.45	0.00	2.38	0	0.000	C	CBC14
325	Landscaping	18745.99	0.430	0.45	0.45	0.00	2.38	0	0.000	C	OS
326	Landscaping	2049.4	0.047	0.45	0.45	0.00	2.38	0	0.000	C	CBC4
327	Landscaping	3453.19	0.079	0.45	0.45	0.00	2.38	0	0.000	B	CBB2
328	Landscaping	7644.65	0.175	0.45	0.45	0.00	2.38	0	0.000	C	CBC8
329	Landscaping	1827.41	0.042	0.45	0.45	0.00	2.38	0	0.000	B	CBC7

Drainage Area	Land Use	Area [A]		Pre-Exist. Runoff Coefficient, [C_{PRE}]	Post-Dev. Runoff Coefficient, [C_{POST}]	Runoff Coefficient [$C=C_{POST}-C_{PRE}$]	Precipitation Depth [P]	Required Storage (V_{REQ} = CPA/12)		Retention Basin	Catch Basin
		sf	ac				in	cf	ac-ft		
330	Pavement	5821.86	0.134	0.45	0.95	0.50	2.38	577	0.013	C	CBC7
331	Pavement	8832.3	0.203	0.45	0.95	0.50	2.38	876	0.020	C	CBC5
332	Landscaping	13208.72	0.303	0.45	0.45	0.00	2.38	0	0.000	C	CBB2
333	Pavement	10787.48	0.248	0.45	0.95	0.50	2.38	1,070	0.025	B	CBB2
334	Pavement	3770.84	0.087	0.45	0.95	0.50	2.38	374	0.009	C	CBC4
335	Pavement	3765.96	0.086	0.45	0.95	0.50	2.38	373	0.009	C	CBC6
336	Landscaping	1332.74	0.031	0.45	0.45	0.00	2.38	0	0.000	C	CBC2
337	Landscaping	2373.73	0.054	0.45	0.45	0.00	2.38	0	0.000	C	CBC5
338	Landscaping	11856.54	0.272	0.45	0.45	0.00	2.38	0	0.000	C	CBC2
339	Pavement	7855.5	0.180	0.45	0.95	0.50	2.38	779	0.018	C	CBC12
340	Pavement	2173.23	0.050	0.45	0.95	0.50	2.38	216	0.005	C	CBC10
341	Pavement	2540.75	0.058	0.45	0.95	0.50	2.38	252	0.006	C	CBC11
342	Landscaping	1375.28	0.032	0.45	0.45	0.00	2.38	0	0.000	C	CBC12
343	Pavement	8871.62	0.204	0.45	0.95	0.50	2.38	880	0.020	C	CBC9
344	Pavement	60476.42	1.388	0.45	0.95	0.50	2.38	5,997	0.138	OS	OS
345	Pavement	21146.63	0.485	0.45	0.95	0.50	2.38	2,097	0.048	A	CBA12
346	Pavement	4,575.16	0.105	0.45	0.95	0.50	2.38	454	0.010	B	CBB14
347	Pavement	224.74	0.005	0.45	0.95	0.50	2.38	22	0.001	B	CBB6
TOTAL	**-**	**792,254**	**18.188**	**-**	**-**		**-**	**60,419**	**1.387**	**-**	-

Basin	Land Use	Pre-Exist. Runoff	Post-Dev. Runoff	Runoff Coefficient	Drainage Area (ft^2)	Required Volume (ft^3)	Provided Surface	Required Underground	Provided Underground	Surplus (ft^3)
A	Landscaping	0.45	0.45	0.00	83,198	0				
	Building	0.45	0.95	0.50	107,944	10,704				
	Pavement	0.45	0.95	0.50	116,837	11,586				
					307,979	22,291		22,291	22,384	93

Basin	Land Use	Pre-Exist. Runoff	Post-Dev. Runoff	Runoff Coefficient	Drainage Area (ft^2)	Required Volume (ft^3)	Provided Surface	Required Underground	Provided Underground	Surplus (ft^3)
B	Landscaping	0.45	0.45	0.00	90,136	0				
	Building	0.45	0.95	0.50	67,702	6,714				
	Pavement	0.45	0.95	0.50	74,664	7,404				
					232,501	14,118		14,118	14,137	19

Basin	Land Use	Pre-Exist. Runoff	Post-Dev. Runoff	Runoff Coefficient	Drainage Area (ft^2)	Required Volume (ft^3)	Provided Surface	Required Underground	Provided Underground	Surplus (ft^3)
C	Landscaping	0.45	0.45	0.00	91,214	0				
	Building	0.45	0.95	0.50	67,454	6,689				
	Pavement	0.45	0.95	0.50	85,763	8,505				
					244,432	15,194		15,194	15,315	121

Underground Retention Summary					
Retention Basin	Required Volume	Diameter	Required Length	Provided Length	Provided Storage
	cf	ft	lf	lf CMP	cf
A	22,291	10	284	285	22,384
B	14,118	10	180	180	14,137
C	15,194	10	194	195	15,315

Bleed-off Summary			
Retention Basin	Volume cf	Disposal cfs	Drain Time hr
UA	22,384	0.50	12.4
UB	14,137	0.50	7.9
UC	15,315	0.50	8.5

Peak Flow Calculations Using The Rational Method

Project:	Legacy & Miller
Proj #:	291878000
Date:	6/22/23
Prep by:	MHH
Check by:	CGF

Base Sheet Prepared By GA, Version 2

Source of Rainfall Data --->NOAA Atlas 14

Rainfall Depth-Duration-Frequency (D-D-F), (inch)					
Storm Fequency	Time				
	5 min	10 min	15 min	30 min	60 min
10-Yr	0.42	0.63	0.78	1.05	1.30
100-Yr	0.65	0.99	1.23	1.65	2.05
Derived Rainfall Intensity-Duration-Frequency (I-D-F), (in/hr)					
10-Yr	4.98	3.79	3.13	2.10	1.30
100-Yr	7.81	5.94	4.92	3.30	2.05

Attach source and supporting data for rainfall depths

AF for Cw per $Cw_{10\text{-}Yr}$		
Freq.	Typical	Applic.
2-Yr	1.00	1.00
5-Yr	1.00	1.00
10-Yr	1.00	1.00
25-Yr	1.10	1.00
50-Yr	1.20	1.00
100-Yr	1.25	1.00

AF=Frequency Adjustment Factor

Drainage Area ID: -----

Tc,calc method: 1=Papadakis and Kazan, 2=Avg Veloc. | 10-Yr | 100-Yr

1 | Tc,calc=11.4*L^0.5*Kb^0.52*S^-0.31*i^-0.38 | Cw for each frequency is adjusted as a function of the 100-year value per the table above

Concent. Point #	Contributing Sub-basins	Total Area (ac)	Base Cw (2-10 yr)	Flow Path, L (ft)	Approx High pt (ft)	Approx Low pt (ft)	Average Slope ft/ft	K_b Class A-->D	m	b	K_b	Initial/lot Tc (min)	Minim allowed Tc,tot = 5.0 Cw AF=1.00	Tc,calc (min)	Tc,tot (min)	i (in/hr)	Q 10-Yr (cfs)	Minim allowed Tc,tot = 5.0 Cw AF=1.00	Tc,calc (min)	Tc,tot (min)	i (in/hr)	Q 100-Yr (cfs)
173	Building	0.072	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0472	0	0.95	3.1	5.0	4.98	0.3	0.95	2.6	5.0	7.81	0.5
174	Building	0.131	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0455	0	0.95	3.0	5.0	4.98	0.6	0.95	2.5	5.0	7.81	1.0
175	Building	0.086	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0467	0	0.95	3.0	5.0	4.98	0.4	0.95	2.6	5.0	7.81	0.6
176	Building	0.004	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0548	0	0.95	3.3	5.0	4.98	0.0	0.95	2.8	5.0	7.81	0.0
177	Building	0.000	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0650	0	0.95	3.6	5.0	4.98	0.0	0.95	3.0	5.0	7.81	0.0
178	Pavement	0.130	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0455	0	0.95	3.0	5.0	4.98	0.6	0.95	2.5	5.0	7.81	1.0
179	Landscaping	0.004	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0551	0	0.45	3.3	5.0	4.98	0.0	0.45	2.8	5.0	7.81	0.0
180	Landscaping	0.008	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0533	0	0.45	3.3	5.0	4.98	0.0	0.45	2.7	5.0	7.81	0.0
181	Building	0.146	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0452	0	0.95	3.0	5.0	4.98	0.7	0.95	2.5	5.0	7.81	1.1
182	Building	0.197	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0444	0	0.95	3.0	5.0	4.98	0.9	0.95	2.5	5.0	7.81	1.5
183	Building	0.197	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0444	0	0.95	3.0	5.0	4.98	0.9	0.95	2.5	5.0	7.81	1.5
184	Landscaping	0.131	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0455	0	0.45	3.0	5.0	4.98	0.3	0.45	2.5	5.0	7.81	0.5
185	Building	0.197	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0444	0	0.95	3.0	5.0	4.98	0.9	0.95	2.5	5.0	7.81	1.5
186	Pavement	0.042	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0486	0	0.95	3.1	5.0	4.98	0.2	0.95	2.6	5.0	7.81	0.3
187	Building	0.197	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0444	0	0.95	3.0	5.0	4.98	0.9	0.95	2.5	5.0	7.81	1.5
188	Building	0.197	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0444	0	0.95	3.0	5.0	4.98	0.9	0.95	2.5	5.0	7.81	1.5
189	Landscaping	0.014	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0515	0	0.45	3.2	5.0	4.98	0.0	0.45	2.7	5.0	7.81	0.1
190	Landscaping	0.021	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0505	0	0.45	3.2	5.0	4.98	0.0	0.45	2.7	5.0	7.81	0.1
191	Building	0.000	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0650	0	0.95	3.6	5.0	4.98	0.0	0.95	3.0	5.0	7.81	0.0
192	Building	0.000	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0650	0	0.95	3.6	5.0	4.98	0.0	0.95	3.0	5.0	7.81	0.0
193	Landscaping	0.050	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0481	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.2
194	Landscaping	0.138	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0454	0	0.45	3.0	5.0	4.98	0.3	0.45	2.5	5.0	7.81	0.5

Peak Flow Calculations Using The Rational Method

Project:	Legacy & Miller
Proj #:	291878000
Date:	6/22/23
Prep by:	MHH
Check by:	CGF

Base Sheet Prepared By GA, Version 2

Source of Rainfall Data --->NOAA Atlas 14

Rainfall Depth-Duration-Frequency (D-D-F), (inch)					
Storm Fequency	Time				
	5 min	10 min	15 min	30 min	60 min
10-Yr	0.42	0.63	0.78	1.05	1.30
100-Yr	0.65	0.99	1.23	1.65	2.05
Derived Rainfall Intensity-Duration-Frequency (I-D-F), (in/hr)					
10-Yr	4.98	3.79	3.13	2.10	1.30
100-Yr	7.81	5.94	4.92	3.30	2.05

Attach source and supporting data for rainfall depths

AF for Cw per $Cw_{10\text{-}Yr}$		
Freq.	Typical	Applic.
2-Yr	1.00	1.00
5-Yr	1.00	1.00
10-Yr	1.00	1.00
25-Yr	1.10	1.00
50-Yr	1.20	1.00
100-Yr	1.25	1.00

AF=Frequency Adjustment Factor

Drainage Area ID: -----

Tc,calc method: 1=Papadakis and Kazan, 2=Avg Veloc. | 10-Yr | 100-Yr

1 | Tc,calc=11.4*L^0.5*Kb^0.52*S^-0.31*i^-0.38 | Cw for each frequency is adjusted as a function of the 100-year value per the table above

Concent. Point #	Contributing Sub-basins	Total Area (ac)	Base Cw (2-10 yr)	Flow Path, L (ft)	Approx High pt (ft)	Approx Low pt (ft)	Average Slope ft/ft	K_b Class A-->D	m	b	K_b	Initial/lot Tc (min)	Minim allowed Tc,tot = 5.0 Cw AF=1.00	Tc,calc (min)	Tc,tot (min)	i (in/hr)	Q 10-Yr (cfs)	Minim allowed Tc,tot = 5.0 Cw AF=1.00	Tc,calc (min)	Tc,tot (min)	i (in/hr)	Q 100-Yr (cfs)
195	Landscaping	0.137	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0454	0	0.45	3.0	5.0	4.98	0.3	0.45	2.5	5.0	7.81	0.5
196	Building	0.197	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0444	0	0.95	3.0	5.0	4.98	0.9	0.95	2.5	5.0	7.81	1.5
197	Building	0.197	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0444	0	0.95	3.0	5.0	4.98	0.9	0.95	2.5	5.0	7.81	1.5
198	Landscaping	0.022	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0503	0	0.45	3.2	5.0	4.98	0.1	0.45	2.7	5.0	7.81	0.1
199	Pavement	0.045	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0484	0	0.95	3.1	5.0	4.98	0.2	0.95	2.6	5.0	7.81	0.3
200	Landscaping	0.026	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0499	0	0.45	3.1	5.0	4.98	0.1	0.45	2.7	5.0	7.81	0.1
201	Building	0.039	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0488	0	0.95	3.1	5.0	4.98	0.2	0.95	2.6	5.0	7.81	0.3
202	Landscaping	0.197	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0444	0	0.45	3.0	5.0	4.98	0.4	0.45	2.5	5.0	7.81	0.7
203	Landscaping	0.024	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0502	0	0.45	3.2	5.0	4.98	0.1	0.45	2.7	5.0	7.81	0.1
204	Landscaping	0.004	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0553	0	0.45	3.3	5.0	4.98	0.0	0.45	2.8	5.0	7.81	0.0
205	Landscaping	0.004	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0551	0	0.45	3.3	5.0	4.98	0.0	0.45	2.8	5.0	7.81	0.0
206	Building	0.097	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0463	0	0.95	3.0	5.0	4.98	0.5	0.95	2.6	5.0	7.81	0.7
207	Landscaping	0.089	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0466	0	0.45	3.0	5.0	4.98	0.2	0.45	2.6	5.0	7.81	0.3
208	Building	0.097	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0463	0	0.95	3.0	5.0	4.98	0.5	0.95	2.6	5.0	7.81	0.7
209	Building	0.097	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0463	0	0.95	3.0	5.0	4.98	0.5	0.95	2.6	5.0	7.81	0.7
210	Landscaping	0.003	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0562	0	0.45	3.3	5.0	4.98	0.0	0.45	2.8	5.0	7.81	0.0
211	Building	0.097	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0463	0	0.95	3.0	5.0	4.98	0.5	0.95	2.6	5.0	7.81	0.7
212	Landscaping	0.020	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0506	0	0.45	3.2	5.0	4.98	0.0	0.45	2.7	5.0	7.81	0.1
213	Landscaping	0.191	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0445	0	0.45	3.0	5.0	4.98	0.4	0.45	2.5	5.0	7.81	0.7
214	Landscaping	0.016	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0513	0	0.45	3.2	5.0	4.98	0.0	0.45	2.7	5.0	7.81	0.1
215	Building	0.097	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0463	0	0.95	3.0	5.0	4.98	0.5	0.95	2.6	5.0	7.81	0.7
216	Landscaping	0.090	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0465	0	0.45	3.0	5.0	4.98	0.2	0.45	2.6	5.0	7.81	0.3

Peak Flow Calculations Using The Rational Method

Source of Rainfall Data --->NOAA Atlas 14

Rainfall Depth-Duration-Frequency (D-D-F), (inch)					
Storm Fequency	Time				
	5 min	10 min	15 min	30 min	60 min
10-Yr	0.42	0.63	0.78	1.05	1.30
100-Yr	0.65	0.99	1.23	1.65	2.05
Derived Rainfall Intensity-Duration-Frequency (I-D-F), (in/hr)					
10-Yr	4.98	3.79	3.13	2.10	1.30
100-Yr	7.81	5.94	4.92	3.30	2.05

Attach source and supporting data for rainfall depths

AF for Cw per $Cw_{10\text{-}Yr}$		
Freq.	Typical	Applic.
2-Yr	1.00	1.00
5-Yr	1.00	1.00
10-Yr	1.00	1.00
25-Yr	1.10	1.00
50-Yr	1.20	1.00
100-Yr	1.25	1.00

AF=Frequency Adjustment Factor

Project: Legacy & Miller
Proj #: 291878000
Date: 6/22/23
Prep by: MHH
Check by: CGF

Base Sheet Prepared By GA, Version 2

Drainage Area ID: -----

Tc,calc method: 1=Papadakis and Kazan, 2=Avg Veloc. | 10-Yr | 100-Yr

1 | Tc,calc=11.4*L^0.5*Kb^0.52*S^-0.31*i^-0.38 | Cw for each frequency is adjusted as a function of the 100-year value per the table above

Concent. Point #	Contributing Sub-basins	Total Area (ac)	Base Cw (2-10 yr)	Flow Path, L (ft)	Approx High pt (ft)	Approx Low pt (ft)	Average Slope ft/ft	K_b Class A-->D	m	b	K_b	Initial/lot Tc (min)	Minim allowed Tc,tot = 5.0 Cw AF=1.00	Tc,calc (min)	Tc,tot (min)	i (in/hr)	Q 10-Yr (cfs)	Minim allowed Tc,tot = 5.0 Cw AF=1.00	Tc,calc (min)	Tc,tot (min)	i (in/hr)	Q 100-Yr (cfs)
217	Building	0.097	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0463	0	0.95	3.0	5.0	4.98	0.5	0.95	2.6	5.0	7.81	0.7
218	Building	0.097	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0463	0	0.95	3.0	5.0	4.98	0.5	0.95	2.6	5.0	7.81	0.7
219	Landscaping	0.089	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0466	0	0.45	3.0	5.0	4.98	0.2	0.45	2.6	5.0	7.81	0.3
220	Building	0.097	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0463	0	0.95	3.0	5.0	4.98	0.5	0.95	2.6	5.0	7.81	0.7
221	Building	0.097	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0463	0	0.95	3.0	5.0	4.98	0.5	0.95	2.6	5.0	7.81	0.7
222	Building	0.072	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0472	0	0.95	3.1	5.0	4.98	0.3	0.95	2.6	5.0	7.81	0.5
223	Building	0.097	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0463	0	0.95	3.0	5.0	4.98	0.5	0.95	2.6	5.0	7.81	0.7
224	Landscaping	0.040	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0488	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.1
225	Landscaping	0.103	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0462	0	0.45	3.0	5.0	4.98	0.2	0.45	2.5	5.0	7.81	0.4
226	Building	0.097	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0463	0	0.95	3.0	5.0	4.98	0.5	0.95	2.6	5.0	7.81	0.7
227	Building	0.097	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0463	0	0.95	3.0	5.0	4.98	0.5	0.95	2.6	5.0	7.81	0.7
228	Building	0.072	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0472	0	0.95	3.1	5.0	4.98	0.3	0.95	2.6	5.0	7.81	0.5
229	Building	0.072	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0472	0	0.95	3.1	5.0	4.98	0.3	0.95	2.6	5.0	7.81	0.5
230	Pavement	0.151	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0451	0	0.95	3.0	5.0	4.98	0.7	0.95	2.5	5.0	7.81	1.1
231	Landscaping	0.106	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0461	0	0.45	3.0	5.0	4.98	0.2	0.45	2.5	5.0	7.81	0.4
232	Building	0.072	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0472	0	0.95	3.1	5.0	4.98	0.3	0.95	2.6	5.0	7.81	0.5
233	Building	0.072	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0472	0	0.95	3.1	5.0	4.98	0.3	0.95	2.6	5.0	7.81	0.5
234	Building	0.072	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0472	0	0.95	3.1	5.0	4.98	0.3	0.95	2.6	5.0	7.81	0.5
235	Building	0.072	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0472	0	0.95	3.1	5.0	4.98	0.3	0.95	2.6	5.0	7.81	0.5
236	Building	0.072	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0472	0	0.95	3.1	5.0	4.98	0.3	0.95	2.6	5.0	7.81	0.5
237	Building	0.000	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0713	0	0.95	3.8	5.0	4.98	0.0	0.95	3.2	5.0	7.81	0.0
238	Building	0.072	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0472	0	0.95	3.1	5.0	4.98	0.3	0.95	2.6	5.0	7.81	0.5

Peak Flow Calculations Using The Rational Method

Source of Rainfall Data --->NOAA Atlas 14

Project:	Legacy & Miller
Proj #:	291878000
Date:	6/22/23
Prep by:	MHH
Check by:	CGF

Base Sheet Prepared By GA, Version 2

Rainfall Depth-Duration-Frequency (D-D-F), (inch)					
Storm Fequency	Time				
	5 min	10 min	15 min	30 min	60 min
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100-Yr	0.65	0.99	1.23	1.65	2.05
Derived Rainfall Intensity-Duration-Frequency (I-D-F), (in/hr)					
10-Yr	4.98	3.79	3.13	2.10	1.30
100-Yr	7.81	5.94	4.92	3.30	2.05

Attach source and supporting data for rainfall depths

AF for Cw per $Cw_{10\text{-}Yr}$		
Freq.	Typical	Applic.
2-Yr	1.00	1.00
5-Yr	1.00	1.00
10-Yr	1.00	1.00
25-Yr	1.10	1.00
50-Yr	1.20	1.00
100-Yr	1.25	1.00

AF=Frequency Adjustment Factor

Drainage Area ID: -----

Tc,calc method: 1=Papadakis and Kazan, 2=Avg Veloc. | 10-Yr | 100-Yr

1 | Tc,calc=11.4*L^0.5*Kb^0.52*S^-0.31*i^-0.38 | Cw for each frequency is adjusted as a function of the 100-year value per the table above

Concent. Point #	Contributing Sub-basins	Total Area (ac)	Base Cw (2-10 yr)	Flow Path, L (ft)	Approx High pt (ft)	Approx Low pt (ft)	Average Slope ft/ft	K_b Class A-->D	m	b	K_b	Initial/lot Tc (min)	Minim allowed Tc,tot = 5.0 Cw AF=1.00	Tc,calc (min)	Tc,tot (min)	i (in/hr)	Q 10-Yr (cfs)	Minim allowed Tc,tot = 5.0 Cw AF=1.00	Tc,calc (min)	Tc,tot (min)	i (in/hr)	Q 100-Yr (cfs)
239	Landscaping	0.094	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0464	0	0.45	3.0	5.0	4.98	0.2	0.45	2.6	5.0	7.81	0.3
240	Building	0.072	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0472	0	0.95	3.1	5.0	4.98	0.3	0.95	2.6	5.0	7.81	0.5
241	Landscaping	0.082	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0468	0	0.45	3.0	5.0	4.98	0.2	0.45	2.6	5.0	7.81	0.3
242	Building	0.072	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0472	0	0.95	3.1	5.0	4.98	0.3	0.95	2.6	5.0	7.81	0.5
243	Landscaping	0.185	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0446	0	0.45	3.0	5.0	4.98	0.4	0.45	2.5	5.0	7.81	0.7
244	Landscaping	0.042	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0486	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.1
245	Pavement	0.058	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0477	0	0.95	3.1	5.0	4.98	0.3	0.95	2.6	5.0	7.81	0.4
246	Landscaping	0.267	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0436	0	0.45	2.9	5.0	4.98	0.6	0.45	2.5	5.0	7.81	0.9
247	Landscaping	0.003	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0560	0	0.45	3.3	5.0	4.98	0.0	0.45	2.8	5.0	7.81	0.0
248	Landscaping	0.042	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0486	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.1
249	Pavement	0.058	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0477	0	0.95	3.1	5.0	4.98	0.3	0.95	2.6	5.0	7.81	0.4
250	Landscaping	0.006	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0539	0	0.45	3.3	5.0	4.98	0.0	0.45	2.8	5.0	7.81	0.0
251	Landscaping	0.180	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0447	0	0.45	3.0	5.0	4.98	0.4	0.45	2.5	5.0	7.81	0.6
252	Landscaping	0.073	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0471	0	0.45	3.1	5.0	4.98	0.2	0.45	2.6	5.0	7.81	0.3
253	Landscaping	0.087	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0466	0	0.45	3.0	5.0	4.98	0.2	0.45	2.6	5.0	7.81	0.3
254	Building	0.198	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0444	0	0.95	3.0	5.0	4.98	0.9	0.95	2.5	5.0	7.81	1.5
255	Landscaping	0.033	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0493	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.1
256	Building	0.198	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0444	0	0.95	3.0	5.0	4.98	0.9	0.95	2.5	5.0	7.81	1.5
257	Landscaping	0.005	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0546	0	0.45	3.3	5.0	4.98	0.0	0.45	2.8	5.0	7.81	0.0
258	Landscaping	0.001	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0581	0	0.45	3.4	5.0	4.98	0.0	0.45	2.9	5.0	7.81	0.0
259	Pavement	0.044	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0485	0	0.95	3.1	5.0	4.98	0.2	0.95	2.6	5.0	7.81	0.3
260	Pavement	0.044	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0485	0	0.95	3.1	5.0	4.98	0.2	0.95	2.6	5.0	7.81	0.3

Peak Flow Calculations Using The Rational Method

Source of Rainfall Data --->NOAA Atlas 14

Rainfall Depth-Duration-Frequency (D-D-F), (inch)					
Storm Fequency	Time				
	5 min	10 min	15 min	30 min	60 min
10-Yr	0.42	0.63	0.78	1.05	1.30
100-Yr	0.65	0.99	1.23	1.65	2.05
Derived Rainfall Intensity-Duration-Frequency (I-D-F), (in/hr)					
10-Yr	4.98	3.79	3.13	2.10	1.30
100-Yr	7.81	5.94	4.92	3.30	2.05

Attach source and supporting data for rainfall depths

AF for Cw per $Cw_{10\text{-}Yr}$		
Freq.	Typical	Applic.
2-Yr	1.00	1.00
5-Yr	1.00	1.00
10-Yr	1.00	1.00
25-Yr	1.10	1.00
50-Yr	1.20	1.00
100-Yr	1.25	1.00

AF=Frequency Adjustment Factor

Project: Legacy & Miller
Proj #: 291878000
Date: 6/22/23
Prep by: MHH
Check by: CGF

Base Sheet Prepared By GA, Version 2

Drainage Area ID: -----

Tc,calc method: 1=Papadakis and Kazan, 2=Avg Veloc. | 10-Yr | 100-Yr

1 | Tc,calc=11.4*L^0.5*Kb^0.52*S^-0.31*i^-0.38 | Cw for each frequency is adjusted as a function of the 100-year value per the table above

Concent. Point #	Contributing Sub-basins	Total Area (ac)	Base Cw (2-10 yr)	Flow Path, L (ft)	Approx High pt (ft)	Approx Low pt (ft)	Average Slope ft/ft	K_b Class A-->D	m	b	K_b	Initial/lot Tc (min)	Minim allowed Tc,tot = 5.0 Cw AF=1.00	Tc,calc (min)	Tc,tot (min)	i (in/hr)	Q 10-Yr (cfs)	Minim allowed Tc,tot = 5.0 Cw AF=1.00	Tc,calc (min)	Tc,tot (min)	i (in/hr)	Q 100-Yr (cfs)
261	Landscaping	0.006	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0539	0	0.45	3.3	5.0	4.98	0.0	0.45	2.8	5.0	7.81	0.0
262	Building	0.401	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0425	0	0.95	2.9	5.0	4.98	1.9	0.95	2.4	5.0	7.81	3.0
263	Landscaping	0.006	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0539	0	0.45	3.3	5.0	4.98	0.0	0.45	2.8	5.0	7.81	0.0
264	Building	0.402	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0425	0	0.95	2.9	5.0	4.98	1.9	0.95	2.4	5.0	7.81	3.0
265	Pavement	0.146	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0452	0	0.95	3.0	5.0	4.98	0.7	0.95	2.5	5.0	7.81	1.1
266	Landscaping	0.043	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0485	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.2
267	Landscaping	0.043	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0485	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.2
268	Landscaping	0.031	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0494	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.1
269	Landscaping	0.043	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0485	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.2
270	Landscaping	0.044	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0485	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.2
271	Landscaping	0.121	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0457	0	0.45	3.0	5.0	4.98	0.3	0.45	2.5	5.0	7.81	0.4
272	Landscaping	0.043	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0485	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.2
273	Landscaping	0.044	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0485	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.2
274	Landscaping	0.347	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0429	0	0.45	2.9	5.0	4.98	0.8	0.45	2.5	5.0	7.81	1.2
275	Landscaping	0.309	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0432	0	0.45	2.9	5.0	4.98	0.7	0.45	2.5	5.0	7.81	1.1
276	Landscaping	0.043	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0485	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.2
277	Landscaping	0.068	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0473	0	0.45	3.1	5.0	4.98	0.2	0.45	2.6	5.0	7.81	0.2
278	Pavement	0.346	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0429	0	0.95	2.9	5.0	4.98	1.6	0.95	2.5	5.0	7.81	2.6
279	Landscaping	0.178	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0447	0	0.45	3.0	5.0	4.98	0.4	0.45	2.5	5.0	7.81	0.6
280	Landscaping	0.039	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0488	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.1
281	Pavement	0.165	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0449	0	0.95	3.0	5.0	4.98	0.8	0.95	2.5	5.0	7.81	1.2
282	Pavement	0.616	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0413	0	0.95	2.9	5.0	4.98	2.9	0.95	2.4	5.0	7.81	4.6

Peak Flow Calculations Using The Rational Method

Project:	Legacy & Miller
Proj #:	291878000
Date:	6/22/23
Prep by:	MHH
Check by:	CGF

Base Sheet Prepared By GA, Version 2

Source of Rainfall Data --->NOAA Atlas 14

Rainfall Depth-Duration-Frequency (D-D-F), (inch)					
Storm Fequency	Time				
	5 min	10 min	15 min	30 min	60 min
10-Yr	0.42	0.63	0.78	1.05	1.30
100-Yr	0.65	0.99	1.23	1.65	2.05
Derived Rainfall Intensity-Duration-Frequency (I-D-F), (in/hr)					
10-Yr	4.98	3.79	3.13	2.10	1.30
100-Yr	7.81	5.94	4.92	3.30	2.05

Attach source and supporting data for rainfall depths

AF for Cw per $Cw_{10\text{-}Yr}$		
Freq.	Typical	Applic.
2-Yr	1.00	1.00
5-Yr	1.00	1.00
10-Yr	1.00	1.00
25-Yr	1.10	1.00
50-Yr	1.20	1.00
100-Yr	1.25	1.00

AF=Frequency Adjustment Factor

Drainage Area ID: -----

Tc,calc method: 1=Papadakis and Kazan, 2=Avg Veloc. | 10-Yr | 100-Yr

1 | Tc,calc=11.4*L^0.5*Kb^0.52*S^-0.31*i^-0.38 | Cw for each frequency is adjusted as a function of the 100-year value per the table above

Concent. Point #	Contributing Sub-basins	Total Area (ac)	Base Cw (2-10 yr)	Flow Path, L (ft)	Approx High pt (ft)	Approx Low pt (ft)	Average Slope ft/ft	K_b Class A-->D	m	b	K_b	Initial/lot Tc (min)	Minim allowed Tc,tot = 5.0 Cw AF=1.00	Tc,calc (min)	Tc,tot (min)	i (in/hr)	Q 10-Yr (cfs)	Minim allowed Tc,tot = 5.0 Cw AF=1.00	Tc,calc (min)	Tc,tot (min)	i (in/hr)	Q 100-Yr (cfs)
283	Pavement	0.037	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0489	0	0.95	3.1	5.0	4.98	0.2	0.95	2.6	5.0	7.81	0.3
284	Landscaping	0.104	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0462	0	0.45	3.0	5.0	4.98	0.2	0.45	2.5	5.0	7.81	0.4
285	Landscaping	0.030	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0495	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.1
286	Landscaping	0.236	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0439	0	0.45	2.9	5.0	4.98	0.5	0.45	2.5	5.0	7.81	0.8
287	Landscaping	0.043	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0485	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.2
288	Landscaping	0.034	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0492	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.1
289	Landscaping	0.039	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0488	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.1
290	Landscaping	0.043	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0486	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.2
291	Landscaping	0.034	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0492	0	0.45	3.1	5.0	4.98	0.1	0.45	2.6	5.0	7.81	0.1
292	Pavement	0.042	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0486	0	0.95	3.1	5.0	4.98	0.2	0.95	2.6	5.0	7.81	0.3
293	Pavement	0.052	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0480	0	0.95	3.1	5.0	4.98	0.2	0.95	2.6	5.0	7.81	0.4
294	Pavement	0.228	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0440	0	0.95	2.9	5.0	4.98	1.1	0.95	2.5	5.0	7.81	1.7

Peak Flow Calculations Using The Rational Method

Source of Rainfall Data --->NOAA Atlas 14

Rainfall Depth-Duration-Frequency (D-D-F), (inch)					
Storm Fequency	Time				
	5 min	10 min	15 min	30 min	60 min
10-Yr	0.42	0.64	0.79	1.06	1.32
100-Yr	0.66	1.00	1.24	1.67	2.07
Derived Rainfall Intensity-Duration-Frequency (I-D-F), (in/hr)					
10-Yr	5.03	3.83	3.16	2.12	1.32
100-Yr	7.88	6.00	4.96	3.34	2.07

Attach source and supporting data for rainfall depths

AF for Cw per $Cw_{10\text{-}Yr}$		
Freq.	Typical	Applic.
2-Yr	1.00	1.00
5-Yr	1.00	1.00
10-Yr	1.00	1.00
25-Yr	1.10	1.00
50-Yr	1.20	1.00
100-Yr	1.25	1.00

AF=Frequency Adjustment Factor

Project: Legacy & Miller
Proj #: 291878000
Date: 6/22/23
Prep by: MHH
Check by: CGF

Base Sheet Prepared By GA, Version 2

Drainage Area ID: -----

Tc,calc method: 1=Papadakis and Kazan, 2=Avg Veloc. = 1

Tc,calc=11.4*L^0.5*Kb^0.52*S^-0.31*i^-0.38

Cw for each frequency is adjusted as a function of the 100-year value per the table above

Concent. Point #	Contributing Sub-basins	Total Area (ac)	Base Cw (2-10 yr)	Flow Path, L (ft)	Approx High pt (ft)	Approx Low pt (ft)	Average Slope ft/ft	K_b Class A-->D	m	b	K_b	Initial/lot Tc (min)	10-Yr Minim allowed Tc,tot = 5.0 Cw AF=1.00	10-Yr Tc,calc (min)	10-Yr Tc,tot (min)	10-Yr i (in/hr)	10-Yr Q (cfs)	100-Yr Minim allowed Tc,tot = 5.0 Cw AF=1.00	100-Yr Tc,calc (min)	100-Yr Tc,tot (min)	100-Yr i (in/hr)	100-Yr Q (cfs)
295	Landscaping	0.040	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0487	0	0.45	3.1	5.0	5.03	0.1	0.45	2.6	5.0	7.88	0.1
296	Landscaping	0.042	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0486	0	0.45	3.1	5.0	5.03	0.1	0.45	2.6	5.0	7.88	0.2
297	Pavement	0.232	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0440	0	0.95	2.9	5.0	5.03	1.1	0.95	2.5	5.0	7.88	1.7
298	Pavement	0.403	0.95	287	37.35	32.33	0.0175	A	-0.00625	0.04	0.0425	0	0.95	4.1	5.0	5.03	1.9	0.95	3.5	5.0	7.88	3.0
299	Landscaping	0.019	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0508	0	0.45	3.2	5.0	5.03	0.0	0.45	2.7	5.0	7.88	0.1
300	Pavement	0.159	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0450	0	0.95	3.0	5.0	5.03	0.8	0.95	2.5	5.0	7.88	1.2
301	Pavement	0.175	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0447	0	0.95	3.0	5.0	5.03	0.8	0.95	2.5	5.0	7.88	1.3
302	Landscaping	0.013	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0518	0	0.45	3.2	5.0	5.03	0.0	0.45	2.7	5.0	7.88	0.0
303	Landscaping	0.023	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0502	0	0.45	3.1	5.0	5.03	0.1	0.45	2.7	5.0	7.88	0.1
304	Pavement	0.058	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0478	0	0.95	3.1	5.0	5.03	0.3	0.95	2.6	5.0	7.88	0.4
305	Pavement	0.077	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0470	0	0.95	3.0	5.0	5.03	0.4	0.95	2.6	5.0	7.88	0.6
306	Pavement	0.085	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0467	0	0.95	3.0	5.0	5.03	0.4	0.95	2.6	5.0	7.88	0.6
307	Pavement	0.050	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0481	0	0.95	3.1	5.0	5.03	0.2	0.95	2.6	5.0	7.88	0.4
308	Pavement	0.151	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0451	0	0.95	3.0	5.0	5.03	0.7	0.95	2.5	5.0	7.88	1.1
309	Landscaping	0.073	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0471	0	0.45	3.0	5.0	5.03	0.2	0.45	2.6	5.0	7.88	0.3
310	Pavement	0.189	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0445	0	0.95	3.0	5.0	5.03	0.9	0.95	2.5	5.0	7.88	1.4
311	Landscaping	0.031	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0494	0	0.45	3.1	5.0	5.03	0.1	0.45	2.6	5.0	7.88	0.1
312	Pavement	0.190	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0445	0	0.95	3.0	5.0	5.03	0.9	0.95	2.5	5.0	7.88	1.4
313	Landscaping	0.024	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0501	0	0.45	3.1	5.0	5.03	0.1	0.45	2.6	5.0	7.88	0.1
314	Pavement	0.190	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0445	0	0.95	3.0	5.0	5.03	0.9	0.95	2.5	5.0	7.88	1.4
315	Pavement	0.186	0.95	270	45.95	43.91	0.0076	A	-0.00625	0.04	0.0446	0	0.95	5.3	5.3	5.03	0.9	0.95	4.5	5.0	7.88	1.4
316	Pavement	0.058	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0477	0	0.95	3.1	5.0	5.03	0.3	0.95	2.6	5.0	7.88	0.4

Peak Flow Calculations Using The Rational Method

Source of Rainfall Data --->NOAA Atlas 14

Rainfall Depth-Duration-Frequency (D-D-F), (inch)					
Storm Fequency	Time				
	5 min	10 min	15 min	30 min	60 min
10-Yr	0.42	0.64	0.79	1.06	1.32
100-Yr	0.66	1.00	1.24	1.67	2.07
Derived Rainfall Intensity-Duration-Frequency (I-D-F), (in/hr)					
10-Yr	5.03	3.83	3.16	2.12	1.32
100-Yr	7.88	6.00	4.96	3.34	2.07

Attach source and supporting data for rainfall depths

AF for Cw per $Cw_{10\text{-}Yr}$		
Freq.	Typical	Applic.
2-Yr	1.00	1.00
5-Yr	1.00	1.00
10-Yr	1.00	1.00
25-Yr	1.10	1.00
50-Yr	1.20	1.00
100-Yr	1.25	1.00

AF=Frequency Adjustment Factor

Project: Legacy & Miller
Proj #: 291878000
Date: 6/22/23
Prep by: MHH
Check by: CGF

Base Sheet Prepared By GA, Version 2

Drainage Area ID: -----

Tc,calc method: 1=Papadakis and Kazan, 2=Avg Veloc. = 1

Tc,calc=11.4*L^0.5*Kb^0.52*S^-0.31*i^-0.38

Cw for each frequency is adjusted as a function of the 100-year value per the table above

Concent. Point #	Contributing Sub-basins	Total Area (ac)	Base Cw (2-10 yr)	Flow Path, L (ft)	Approx High pt (ft)	Approx Low pt (ft)	Average Slope ft/ft	K_b Class A-->D	m	b	K_b	Initial/lot Tc (min)	10-Yr Minim allowed Tc,tot = 5.0 Cw AF=1.00	10-Yr Tc,calc (min)	10-Yr Tc,tot (min)	10-Yr i (in/hr)	10-Yr Q (cfs)	100-Yr Minim allowed Tc,tot = 5.0 Cw AF=1.00	100-Yr Tc,calc (min)	100-Yr Tc,tot (min)	100-Yr i (in/hr)	100-Yr Q (cfs)
317	Pavement	0.058	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0477	0	0.95	3.1	5.0	5.03	0.3	0.95	2.6	5.0	7.88	0.4
318	Pavement	0.058	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0477	0	0.95	3.1	5.0	5.03	0.3	0.95	2.6	5.0	7.88	0.4
319	Pavement	0.523	0.95	420	43.95	40.44	0.0084	A	-0.00625	0.04	0.0418	0	0.95	6.3	6.3	4.79	2.4	0.95	5.2	5.2	7.88	3.9
320	Landscaping	0.042	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0486	0	0.45	3.1	5.0	5.03	0.1	0.45	2.6	5.0	7.88	0.2
321	Building	0.413	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0424	0	0.95	2.9	5.0	5.03	2.0	0.95	2.4	5.0	7.88	3.1
322	Pavement	0.128	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0456	0	0.95	3.0	5.0	5.03	0.6	0.95	2.5	5.0	7.88	1.0
323	Landscaping	0.021	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0504	0	0.45	3.2	5.0	5.03	0.0	0.45	2.7	5.0	7.88	0.1
324	Landscaping	0.028	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0498	0	0.45	3.1	5.0	5.03	0.1	0.45	2.6	5.0	7.88	0.1
325	Landscaping	0.430	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0423	0	0.45	2.9	5.0	5.03	1.0	0.45	2.4	5.0	7.88	1.5
326	Landscaping	0.047	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0483	0	0.45	3.1	5.0	5.03	0.1	0.45	2.6	5.0	7.88	0.2
327	Landscaping	0.079	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0469	0	0.45	3.0	5.0	5.03	0.2	0.45	2.6	5.0	7.88	0.3
328	Landscaping	0.175	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0447	0	0.45	3.0	5.0	5.03	0.4	0.45	2.5	5.0	7.88	0.6
329	Landscaping	0.042	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0486	0	0.45	3.1	5.0	5.03	0.1	0.45	2.6	5.0	7.88	0.1
330	Pavement	0.134	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0455	0	0.95	3.0	5.0	5.03	0.6	0.95	2.5	5.0	7.88	1.0
331	Pavement	0.203	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0443	0	0.95	2.9	5.0	5.03	1.0	0.95	2.5	5.0	7.88	1.5
332	Landscaping	0.303	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0432	0	0.45	2.9	5.0	5.03	0.7	0.45	2.5	5.0	7.88	1.1
333	Pavement	0.248	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0438	0	0.95	2.9	5.0	5.03	1.2	0.95	2.5	5.0	7.88	1.9
334	Pavement	0.087	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0466	0	0.95	3.0	5.0	5.03	0.4	0.95	2.6	5.0	7.88	0.6
335	Pavement	0.086	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0466	0	0.95	3.0	5.0	5.03	0.4	0.95	2.6	5.0	7.88	0.6
336	Landscaping	0.031	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0495	0	0.45	3.1	5.0	5.03	0.1	0.45	2.6	5.0	7.88	0.1
337	Landscaping	0.054	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0479	0	0.45	3.1	5.0	5.03	0.1	0.45	2.6	5.0	7.88	0.2
338	Landscaping	0.272	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0435	0	0.45	2.9	5.0	5.03	0.6	0.45	2.5	5.0	7.88	1.0

Peak Flow Calculations Using The Rational Method

Project:	Legacy & Miller
Proj #:	291878000
Date:	6/22/23
Prep by:	MHH
Check by:	CGF

Base Sheet Prepared By GA, Version 2

Source of Rainfall Data --->NOAA Atlas 14

Rainfall Depth-Duration-Frequency (D-D-F), (inch)					
Storm Fequency	Time				
	5 min	10 min	15 min	30 min	60 min
10-Yr	0.42	0.64	0.79	1.06	1.32
100-Yr	0.66	1.00	1.24	1.67	2.07
Derived Rainfall Intensity-Duration-Frequency (I-D-F), (in/hr)					
10-Yr	5.03	3.83	3.16	2.12	1.32
100-Yr	7.88	6.00	4.96	3.34	2.07

Attach source and supporting data for rainfall depths

AF for Cw per $Cw_{10\text{-}Yr}$		
Freq.	Typical	Applic.
2-Yr	1.00	1.00
5-Yr	1.00	1.00
10-Yr	1.00	1.00
25-Yr	1.10	1.00
50-Yr	1.20	1.00
100-Yr	1.25	1.00

AF=Frequency Adjustment Factor

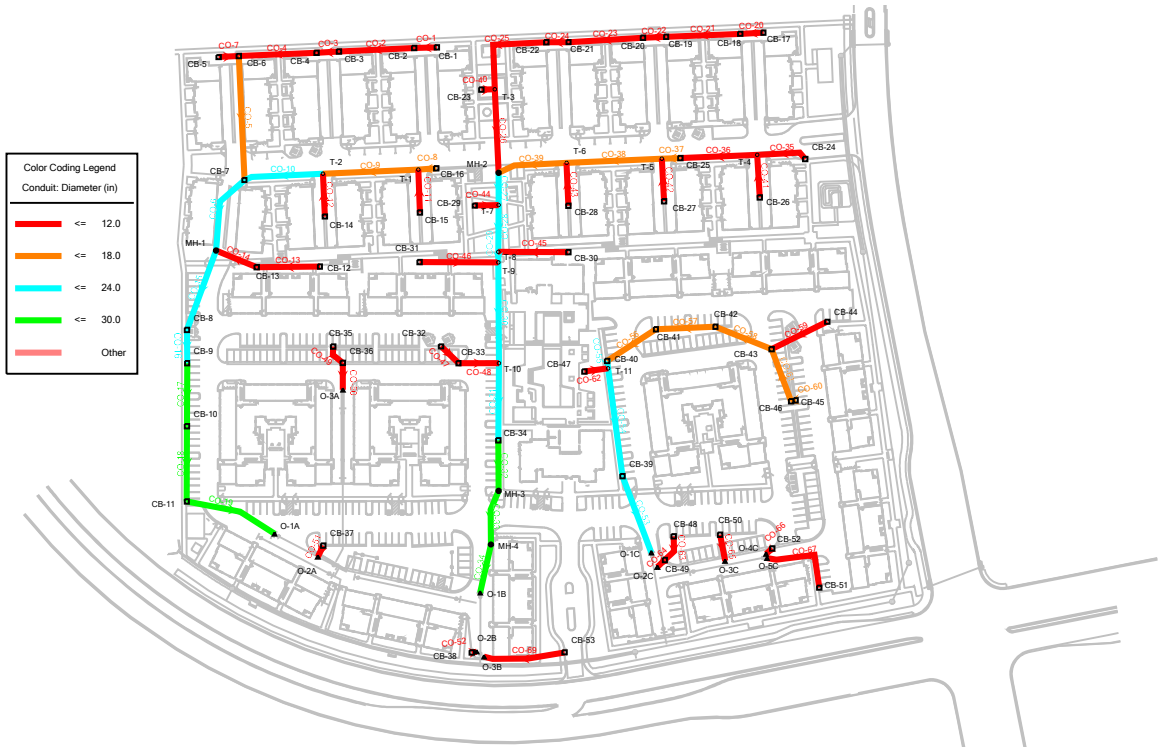
Drainage Area ID: -----

Tc,calc method: 1=Papadakis and Kazan, 2=Avg Veloc. | 10-Yr | 100-Yr

1 | Tc,calc=11.4*L^0.5*Kb^0.52*S^-0.31*i^-0.38 | Cw for each frequency is adjusted as a function of the 100-year value per the table above

Concent. Point #	Contributing Sub-basins	Total Area (ac)	Base Cw (2-10 yr)	Flow Path, L (ft)	Approx High pt (ft)	Approx Low pt (ft)	Average Slope ft/ft	K_b Class A-->D	m	b	K_b	Initial/lot Tc (min)	Minim allowed Tc,tot = 5.0 Cw AF=1.00	Tc,calc (min)	Tc,tot (min)	i (in/hr)	Q 10-Yr (cfs)	Minim allowed Tc,tot = 5.0 Cw AF=1.00	Tc,calc (min)	Tc,tot (min)	i (in/hr)	Q 100-Yr (cfs)
339	Pavement	0.180	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0446	0	0.95	3.0	5.0	5.03	0.9	0.95	2.5	5.0	7.88	1.4
340	Pavement	0.050	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0481	0	0.95	3.1	5.0	5.03	0.2	0.95	2.6	5.0	7.88	0.4
341	Pavement	0.058	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0477	0	0.95	3.1	5.0	5.03	0.3	0.95	2.6	5.0	7.88	0.4
342	Landscaping	0.032	0.45	100	1	0	0.0100	A	-0.00625	0.04	0.0494	0	0.45	3.1	5.0	5.03	0.1	0.45	2.6	5.0	7.88	0.1
343	Pavement	0.204	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0443	0	0.95	2.9	5.0	5.03	1.0	0.95	2.5	5.0	7.88	1.5
344	Pavement	1.388	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0391	0	0.95	2.8	5.0	5.03	6.6	0.95	2.3	5.0	7.88	10.4
345	Pavement	0.485	0.95	470	45.46	41.98	0.0074	A	-0.00625	0.04	0.0420	0	0.95	6.9	6.9	4.79	2.2	0.95	5.7	5.7	7.88	3.6
346	Pavement	0.105	0.95	470	1	0	0.0021	A	-0.00625	0.04	0.0461	0	0.95	11.8	11.8	3.69	0.4	0.95	9.6	9.6	6.38	0.6
347	Pavement	0.005	0.95	100	1	0	0.0100	A	-0.00625	0.04	0.0543	0	0.95	3.3	5.0	5.03	0.0	0.95	2.8	5.0	7.88	0.0

StormCAD Network



FlexTable: Catch Basin Table

Label	Elevation (Ground) (ft)	Elevation (Invert) (ft)	Hydraulic Grade Line (In) (ft)	Headloss Method	Headloss Coefficient (Standard)	Inlet Location	Flow (Additional Subsurface) (cfs)
CB-1	43.84	39.84	40.24	Standard	1.200	In Sag	0.40
CB-2	43.84	39.68	40.18	Standard	1.200	In Sag	0.30
CB-3	43.34	39.17	39.77	Standard	1.200	In Sag	0.20
CB-4	43.34	39.02	39.66	Standard	1.200	In Sag	0.20
CB-5	42.84	38.84	39.10	Standard	1.200	In Sag	0.20
CB-6	42.83	37.99	38.98	Standard	1.200	In Sag	0.20
CB-7	40.39	33.60	38.93	Standard	1.200	In Sag	9.70
CB-8	36.70	31.33	34.81	Standard	1.200	In Sag	1.20
CB-9	35.36	29.86	32.93	Standard	1.200	In Sag	1.60
CB-10	35.39	28.46	31.95	Standard	1.200	In Sag	0.60
CB-11	35.11	27.95	30.85	Standard	1.200	In Sag	1.00
CB-12	38.85	35.35	37.92	Standard	1.200	In Sag	1.90
CB-13	39.22	34.49	37.57	Standard	1.200	In Sag	0.90
CB-14	41.14	37.14	39.50	Standard	1.200	In Sag	1.50
CB-15	41.64	37.64	40.86	Standard	1.200	In Sag	1.50
CB-16	41.96	35.41	41.19	Standard	1.200	In Sag	7.80
CB-17	45.84	41.84	42.10	Standard	1.200	In Sag	0.20
CB-18	45.84	41.46	41.83	Standard	1.200	In Sag	0.20
CB-19	45.34	40.21	40.67	Standard	1.200	In Sag	0.20
CB-20	45.34	39.83	40.37	Standard	1.200	In Sag	0.20
CB-21	45.34	38.58	39.16	Standard	1.200	In Sag	0.10
CB-22	45.34	38.20	38.81	Standard	1.200	In Sag	0.10
CB-23	44.41	38.99	39.67	Standard	1.200	In Sag	1.20
CB-24	43.60	38.28	40.38	Standard	1.200	In Sag	2.10
CB-25	43.90	37.41	38.68	Standard	1.200	In Sag	0.50
CB-26	44.14	40.14	40.91	Standard	1.200	In Sag	1.50
CB-27	43.64	39.64	40.41	Standard	1.200	In Sag	1.50
CB-28	43.14	39.14	39.91	Standard	1.200	In Sag	1.50
CB-29	42.19	37.68	38.26	Standard	1.200	In Sag	0.90
CB-30	41.34	36.87	37.48	Standard	1.200	In Sag	1.00
CB-31	39.44	35.44	36.37	Standard	1.200	In Sag	2.10
CB-32	37.80	33.80	34.17	Standard	1.200	In Sag	0.40
CB-33	36.37	31.92	33.95	Standard	1.200	In Sag	3.10
CB-34	35.68	28.83	31.26	Standard	1.200	In Sag	5.40
CB-35	37.18	32.68	33.58	Standard	1.200	In Sag	1.40
CB-36	36.24	32.30	33.47	Standard	1.200	In Sag	1.60
CB-37	33.14	27.15	29.02	Standard	1.200	In Sag	5.40
CB-38	32.72	25.44	25.86	Standard	1.200	In Sag	0.50
CB-39	38.40	31.00	33.19	Standard	1.200	In Sag	1.10
CB-40	38.66	31.79	34.36	Standard	1.200	In Sag	1.70
CB-41	40.65	32.68	35.92	Standard	1.200	In Sag	1.80
CB-42	40.69	33.09	37.03	Standard	1.200	In Sag	0.40
CB-43	38.99	33.50	38.04	Standard	1.200	In Sag	1.50
CB-44	41.08	34.42	38.86	Standard	1.200	In Sag	2.90
CB-45	39.01	34.90	38.35	Standard	1.200	In Sag	3.30
CB-46	39.22	34.88	38.28	Standard	1.200	In Sag	1.00
CB-47	37.36	34.20	35.00	Standard	1.200	In Sag	1.60

FlexTable: Catch Basin Table

Label	Elevation (Ground) (ft)	Elevation (Invert) (ft)	Hydraulic Grade Line (In) (ft)	Headloss Method	Headloss Coefficient (Standard)	Inlet Location	Flow (Additional Subsurface) (cfs)
CB-48	36.96	32.96	34.32	Standard	1.200	In Sag	3.70
CB-49	34.93	29.80	31.60	Standard	1.200	In Sag	1.50
CB-50	37.02	32.52	33.23	Standard	1.200	In Sag	1.30
CB-51	37.57	33.57	34.85	Standard	1.200	In Sag	3.40
CB-52	36.26	29.88	31.21	Standard	1.200	In Sag	3.60
CB-53	31.47	27.47	31.62	Standard	1.200	In Sag	6.30

FlexTable: Manhole Table

Label	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Flow (Total Out) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Headloss Method	Headloss Coefficient (Standard)
MH-1	40.25	32.48	24.80	36.96	36.19	Standard	0.800
MH-2	42.66	35.16	9.30	36.60	36.25	Standard	0.800
MH-3	36.13	27.60	22.20	30.05	29.43	Standard	1.200
MH-4	33.47	27.13	22.20	29.29	28.73	Standard	0.800

FlexTable: Conduit Table

Label	Diameter (in)	Start Node	Invert (Start) (ft)	Stop Node	Invert (Stop) (ft)	Length (Scaled) (ft)	Slope (Calculated) (ft/ft)	Manning's n	Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Headloss (ft)
CO-1	12.0	CB-1	39.84	CB-2	39.68	31.0	0.005	0.013	0.40	2.56	2.37	0.00
CO-2	12.0	CB-2	39.68	CB-3	39.17	102.6	0.005	0.013	0.70	2.51	2.74	0.27
CO-3	12.0	CB-3	39.17	CB-4	39.02	30.7	0.005	0.013	0.90	2.49	2.92	0.02
CO-4	12.0	CB-4	39.02	CB-6	38.49	106.0	0.005	0.013	1.10	2.52	3.10	0.50
CO-5	18.0	CB-6	37.99	CB-7	34.10	169.2	0.023	0.013	1.50	15.92	5.66	0.02
CO-6	24.0	CB-7	33.60	MH-1	32.48	111.4	0.010	0.013	22.00	22.68	7.00	1.05
CO-7	12.0	CB-5	38.84	CB-6	38.49	27.4	0.013	0.013	0.20	4.02	2.66	0.04
CO-8	18.0	CB-16	35.41	T-1	35.29	24.5	0.005	0.013	7.80	7.35	4.41	0.14
CO-9	18.0	T-1	35.29	T-2	34.64	130.3	0.005	0.013	9.30	7.42	5.26	1.02
CO-10	24.0	T-2	34.64	CB-7	34.10	108.0	0.005	0.013	10.80	16.00	3.44	0.25
CO-11	12.0	CB-15	37.64	T-1	35.29	58.3	0.040	0.013	1.50	7.15	1.91	0.10
CO-12	12.0	CB-14	37.14	T-2	34.64	58.2	0.043	0.013	1.50	7.39	1.91	0.10
CO-13	12.0	CB-12	35.35	CB-13	34.49	86.2	0.010	0.013	1.90	3.56	2.42	0.25
CO-14	12.0	CB-13	34.49	MH-1	32.48	59.8	0.034	0.013	2.80	6.53	3.57	0.37
CO-15	24.0	MH-1	32.48	CB-8	31.33	115.1	0.010	0.013	24.80	22.61	7.89	1.38
CO-16	24.0	CB-8	31.33	CB-9	30.36	45.4	0.021	0.013	26.00	33.05	8.28	0.60
CO-17	30.0	CB-9	29.86	CB-10	28.46	85.8	0.016	0.013	27.60	52.39	10.81	0.39
CO-18	30.0	CB-10	28.46	CB-11	27.95	102.6	0.005	0.013	28.20	28.91	5.74	0.49
CO-19	30.0	CB-11	27.95	O-1A	24.34	129.8	0.028	0.013	29.20	68.39	13.38	4.29
CO-20	12.0	CB-17	41.84	CB-18	41.46	31.6	0.012	0.013	0.20	3.91	2.61	0.19
CO-21	12.0	CB-18	41.46	CB-19	40.21	101.1	0.012	0.013	0.40	3.96	3.24	1.05
CO-22	12.0	CB-19	40.21	CB-20	39.83	31.8	0.012	0.013	0.60	3.89	3.59	0.16
CO-23	12.0	CB-20	39.83	CB-21	38.58	101.4	0.012	0.013	0.80	3.96	3.94	1.05
CO-24	12.0	CB-21	38.58	CB-22	38.20	30.4	0.013	0.013	0.90	3.99	4.10	0.17
CO-25	12.0	CB-22	38.20	T-3	37.53	133.4	0.005	0.013	1.00	2.53	3.03	0.22
CO-26	12.0	T-3	37.53	MH-2	36.96	113.9	0.005	0.013	2.20	2.52	3.62	0.66
CO-27	24.0	MH-2	35.16	T-7	34.46	43.9	0.016	0.013	9.30	28.56	8.13	0.27
CO-28	24.0	T-7	34.46	T-8	33.43	64.0	0.016	0.013	10.20	28.70	8.36	0.19
CO-29	24.0	T-8	33.43	T-9	33.71	14.3	-0.020	0.013	11.20	31.62	3.57	0.26
CO-30	24.0	T-9	33.21	T-10	31.00	137.2	0.016	0.013	13.30	28.71	8.97	1.48
CO-31	24.0	T-10	31.00	CB-34	29.33	105.3	0.016	0.013	16.80	28.49	9.44	1.21
CO-32	30.0	CB-34	28.83	MH-3	27.70	68.9	0.016	0.013	22.20	52.53	10.25	0.38

FlexTable: Conduit Table

Label	Diameter (in)	Start Node	Invert (Start) (ft)	Stop Node	Invert (Stop) (ft)	Length (Scaled) (ft)	Slope (Calculated) (ft/ft)	Manning's n	Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Headloss (ft)
CO-33	30.0	MH-3	27.60	MH-4	27.23	75.2	0.005	0.013	22.20	28.76	6.47	0.14
CO-34	30.0	MH-4	27.13	O-1B	24.40	67.4	0.040	0.013	22.20	82.54	14.26	3.38
CO-35	12.0	CB-24	38.28	T-4	37.94	69.7	0.005	0.013	2.10	2.49	2.67	0.24
CO-36	12.0	T-4	37.94	CB-25	37.41	104.6	0.005	0.013	3.60	2.54	4.58	1.07
CO-37	18.0	CB-25	37.41	T-5	36.79	25.4	0.024	0.013	4.10	16.41	7.72	-0.01
CO-38	18.0	T-5	36.79	T-6	36.64	129.9	0.001	0.013	5.60	3.57	3.17	0.36
CO-39	18.0	T-6	36.64	MH-2	35.66	95.2	0.010	0.013	7.10	10.66	6.46	1.12
CO-40	12.0	CB-23	38.99	T-3	37.53	18.4	0.079	0.013	1.20	10.04	8.61	1.04
CO-41	12.0	CB-26	40.14	T-4	37.94	58.2	0.038	0.013	1.50	6.93	7.04	0.65
CO-42	12.0	CB-27	39.64	T-5	36.79	58.3	0.049	0.013	1.50	7.87	7.72	1.63
CO-43	12.0	CB-28	39.14	T-6	36.64	58.6	0.043	0.013	1.50	7.36	7.36	1.61
CO-44	12.0	CB-29	37.68	T-7	34.96	32.5	0.084	0.013	0.90	10.31	8.07	2.10
CO-45	12.0	CB-30	36.87	T-8	33.93	95.3	0.031	0.013	1.00	6.26	5.83	1.87
CO-46	12.0	CB-31	35.44	T-9	33.21	107.4	0.021	0.013	2.10	5.13	6.20	1.08
CO-47	12.0	CB-32	33.80	CB-33	31.92	33.0	0.057	0.013	0.40	8.51	5.54	0.11
CO-48	12.0	CB-33	31.92	T-10	31.50	55.1	0.008	0.013	3.50	3.11	4.46	0.53
CO-49	12.0	CB-35	32.68	CB-36	32.30	28.6	0.013	0.013	1.40	4.10	4.73	0.03
CO-50	12.0	CB-36	32.30	O-3A	27.52	36.9	0.130	0.013	3.00	12.83	13.33	5.19
CO-51	12.0	CB-37	27.15	O-2A	26.17	17.3	0.057	0.013	5.40	8.48	11.44	1.26
CO-52	12.0	CB-38	25.44	O-2B	24.92	6.9	0.075	0.013	0.50	9.76	6.52	0.65
CO-53	24.0	O-1C	27.92	CB-39	31.00	111.6	-0.028	0.013	15.30	37.57	11.35	3.60
CO-54	24.0	CB-39	31.00	T-11	31.74	148.0	-0.005	0.013	14.20	15.99	4.52	0.58
CO-55	24.0	T-11	31.74	CB-40	31.79	10.2	-0.005	0.013	12.60	15.88	4.01	0.03
CO-56	18.0	CB-40	31.79	CB-41	32.29	79.4	-0.006	0.013	10.90	8.34	6.17	0.85
CO-57	18.0	CB-41	32.68	CB-42	33.09	81.2	-0.005	0.013	9.10	7.46	5.15	0.61
CO-58	18.0	CB-42	33.09	CB-43	33.50	82.5	-0.005	0.013	8.70	7.40	4.92	0.57
CO-59	12.0	CB-43	33.50	CB-44	34.00	84.5	-0.006	0.013	2.90	2.74	3.69	0.56
CO-60	18.0	CB-45	34.90	CB-46	34.88	6.6	0.003	0.013	3.30	5.80	1.87	0.01
CO-61	18.0	CB-46	34.88	CB-43	33.50	75.7	0.018	0.013	4.30	14.18	2.43	0.13
CO-62	12.0	CB-47	34.20	T-11	31.74	32.7	0.075	0.013	1.60	9.77	9.18	0.71
CO-63	12.0	CB-48	32.96	CB-49	29.80	37.5	0.084	0.013	3.70	10.35	12.08	2.18
CO-64	12.0	CB-49	29.80	O-2C	28.70	14.2	0.078	0.013	5.20	9.93	12.79	1.42

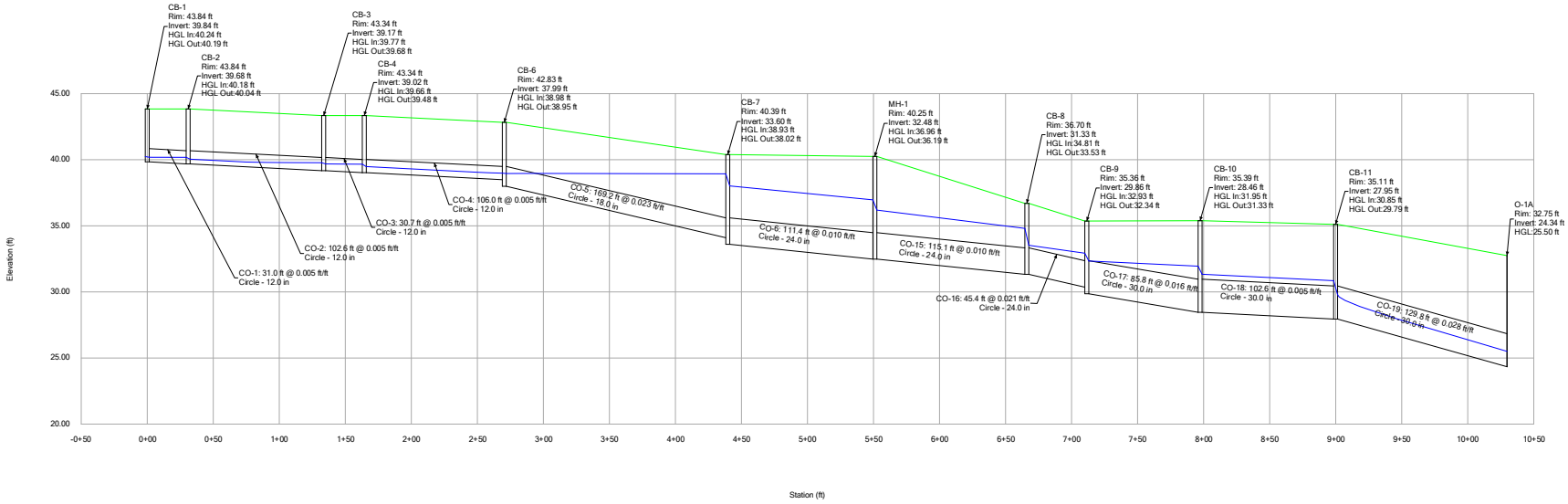
FlexTable: Conduit Table

Label	Diameter (in)	Start Node	Invert (Start) (ft)	Stop Node	Invert (Stop) (ft)	Length (Scaled) (ft)	Slope (Calculated) (ft/ft)	Manning's n	Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Headloss (ft)
CO-65	12.0	CB-50	32.52	O-3C	29.54	36.6	0.081	0.013	1.30	10.17	8.89	3.22
CO-66	12.0	CB-52	29.88	O-4C	28.85	11.2	0.092	0.013	3.60	10.80	12.36	1.36
CO-67	12.0	CB-51	33.57	O-5C	26.85	110.1	0.061	0.013	3.40	8.80	10.49	6.44
CO-69	12.0	CB-53	27.47	O-3B	25.97	110.7	0.014	0.013	6.30	4.15	8.02	3.48

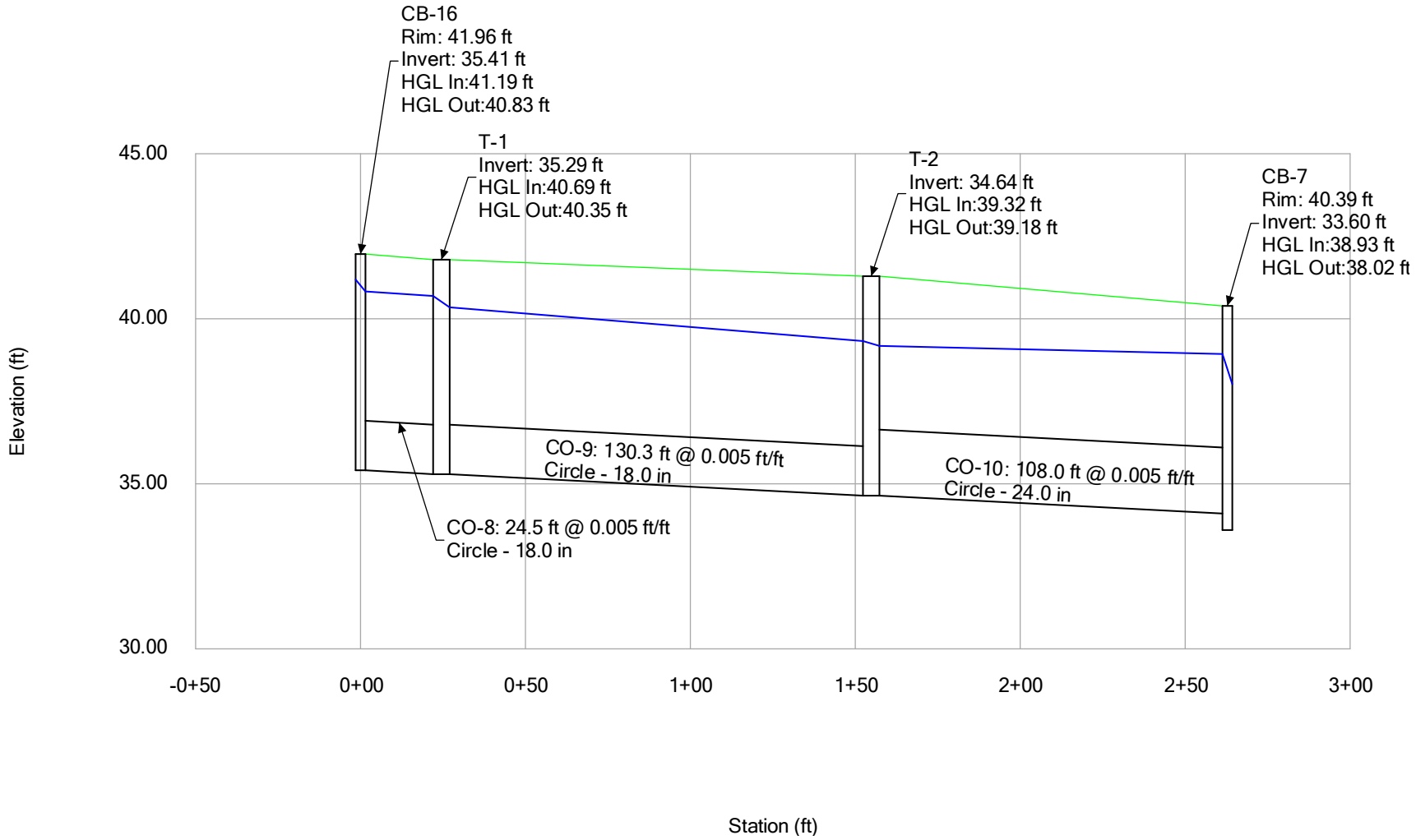
FlexTable: Outfall Table

Label	Elevation (Ground) (ft)	Elevation (Invert) (ft)	Boundary Condition Type	Elevation (User Defined Tailwater) (ft)	Hydraulic Grade (ft)	Flow (Total Out) (cfs)
O-1A	32.75	24.34	User Defined Tailwater	24.00	25.50	29.20
O-1B	33.20	24.40	User Defined Tailwater	24.80	25.35	22.20
O-1C	35.32	27.92	User Defined Tailwater	27.92	28.81	15.30
O-2A	32.32	26.17	User Defined Tailwater	24.00	26.83	5.40
O-2B	32.91	24.92	User Defined Tailwater	24.80	25.09	0.50
O-2C	35.19	28.70	User Defined Tailwater	27.92	29.31	5.20
O-3A	36.62	27.52	User Defined Tailwater	24.00	27.85	3.00
O-3B	33.17	25.97	User Defined Tailwater	24.80	26.93	6.30
O-3C	36.69	29.54	User Defined Tailwater	27.92	29.78	1.30
O-4C	36.55	28.85	User Defined Tailwater	27.92	29.33	3.60
O-5C	36.61	26.85	User Defined Tailwater	27.92	27.92	3.40

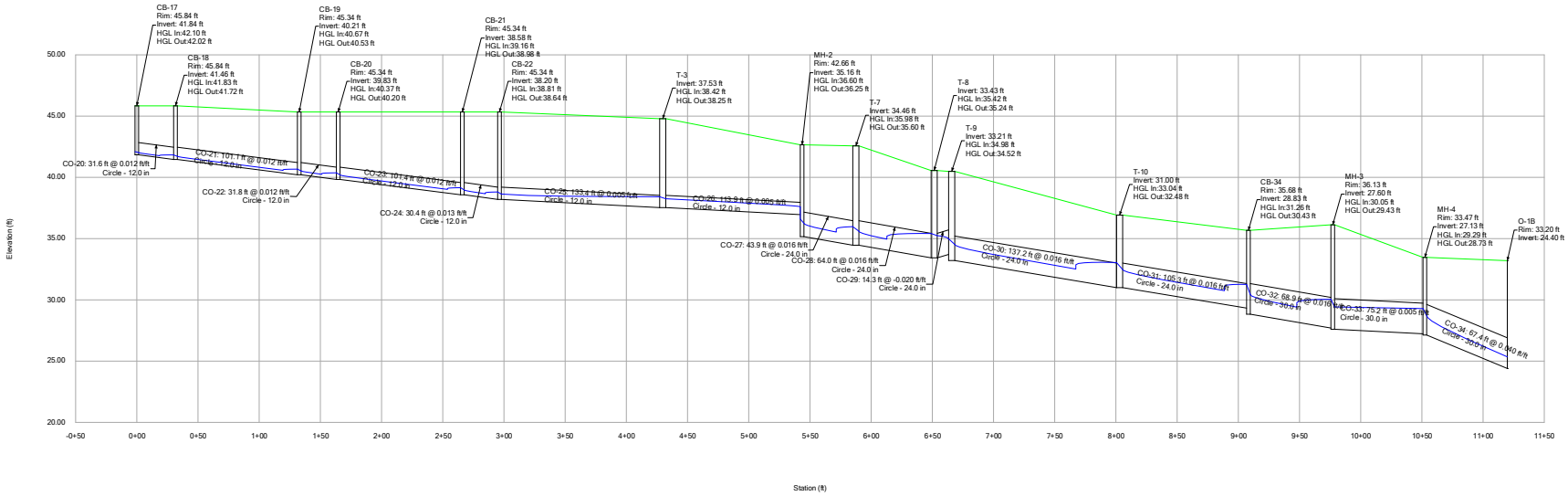
Profile Report
Engineering Profile - Profile - O1A (Legacy StormCAD model.stsw)



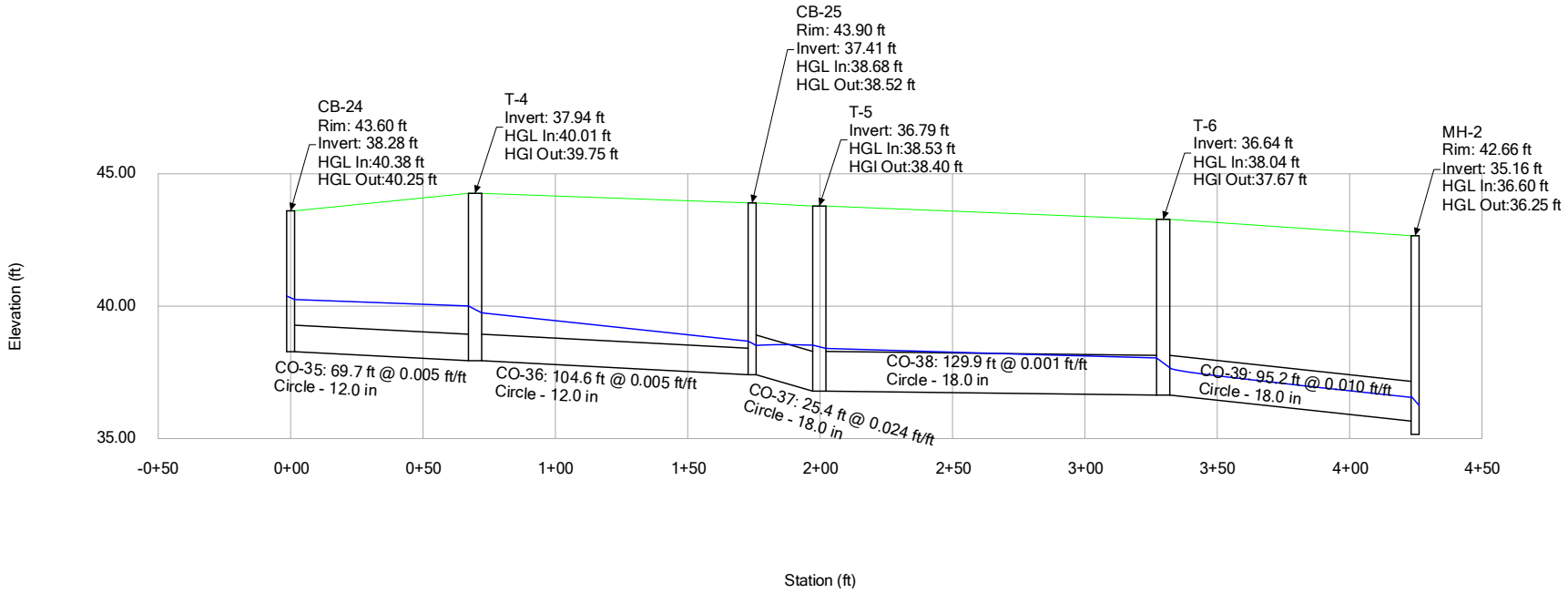
Profile Report
Engineering Profile - Profile - CB7 (Legacy StormCAD model.stsw)



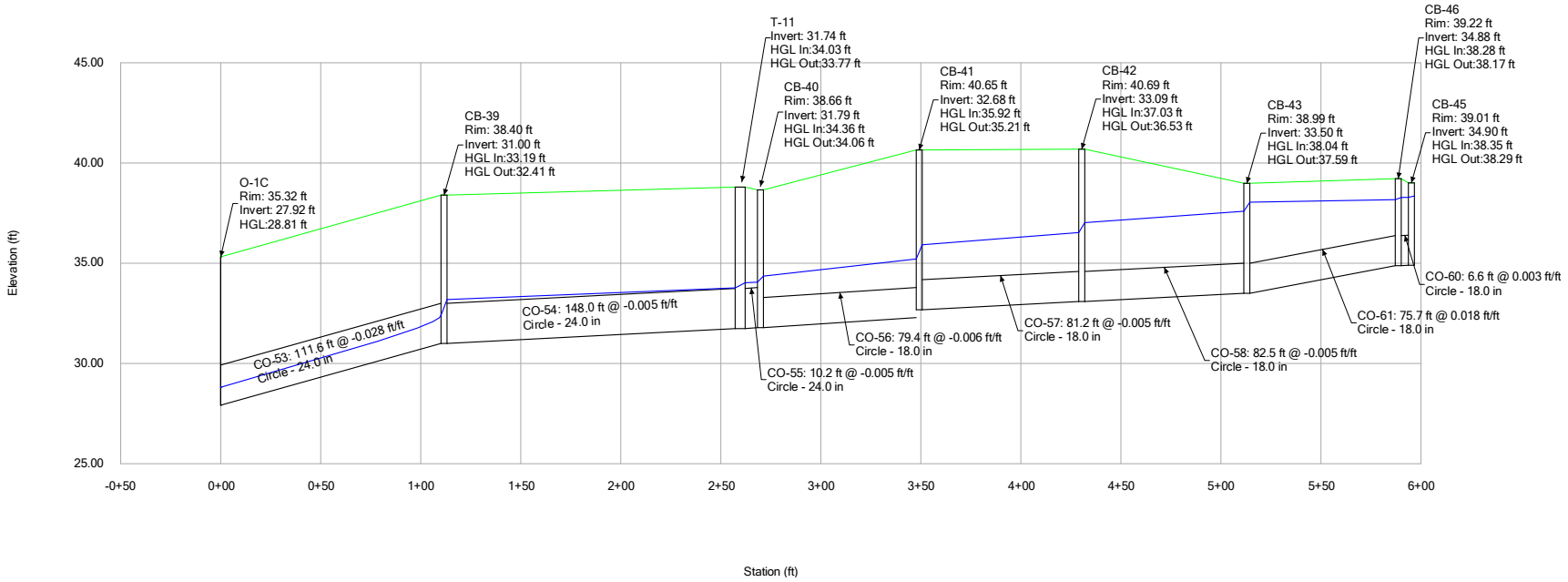
Profile Report
Engineering Profile - Profile - O1B (Legacy StormCAD model.stsw)



Profile Report
Engineering Profile - Profile - 1 (Legacy StormCAD model.stsw)

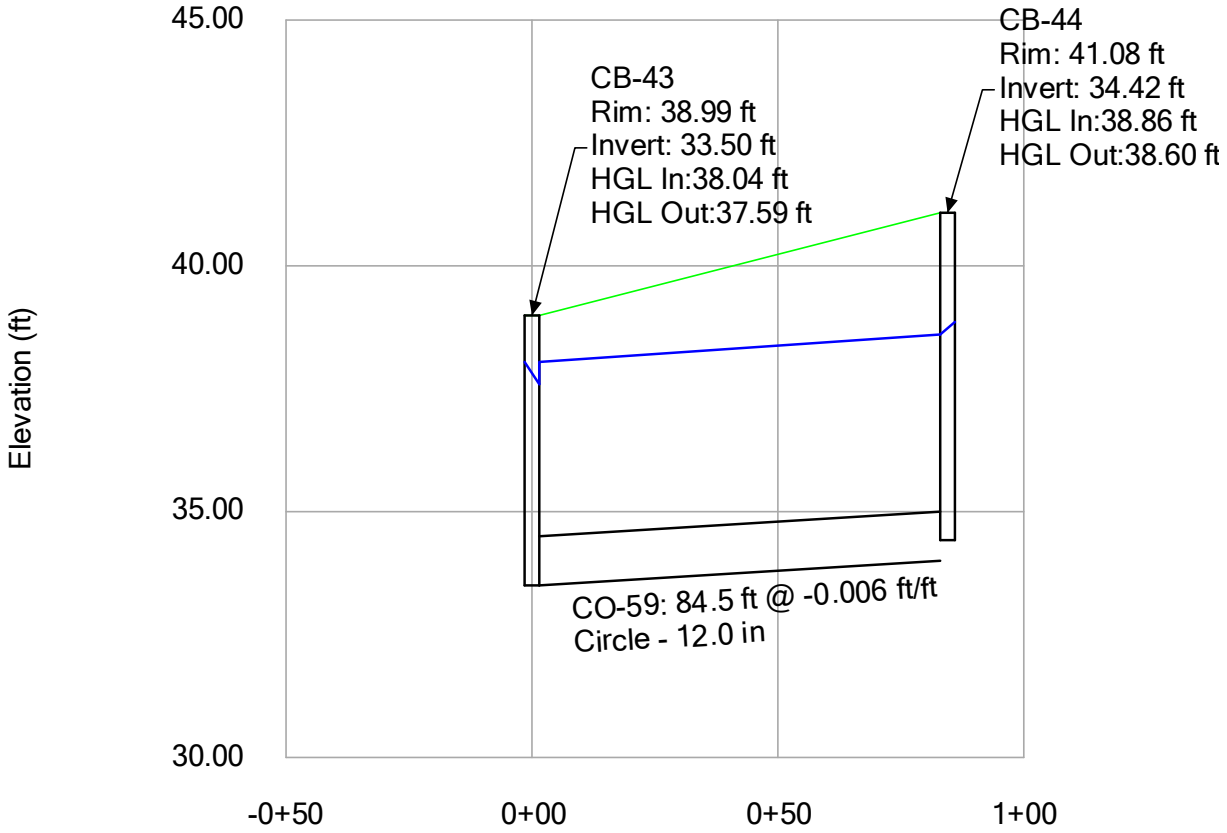


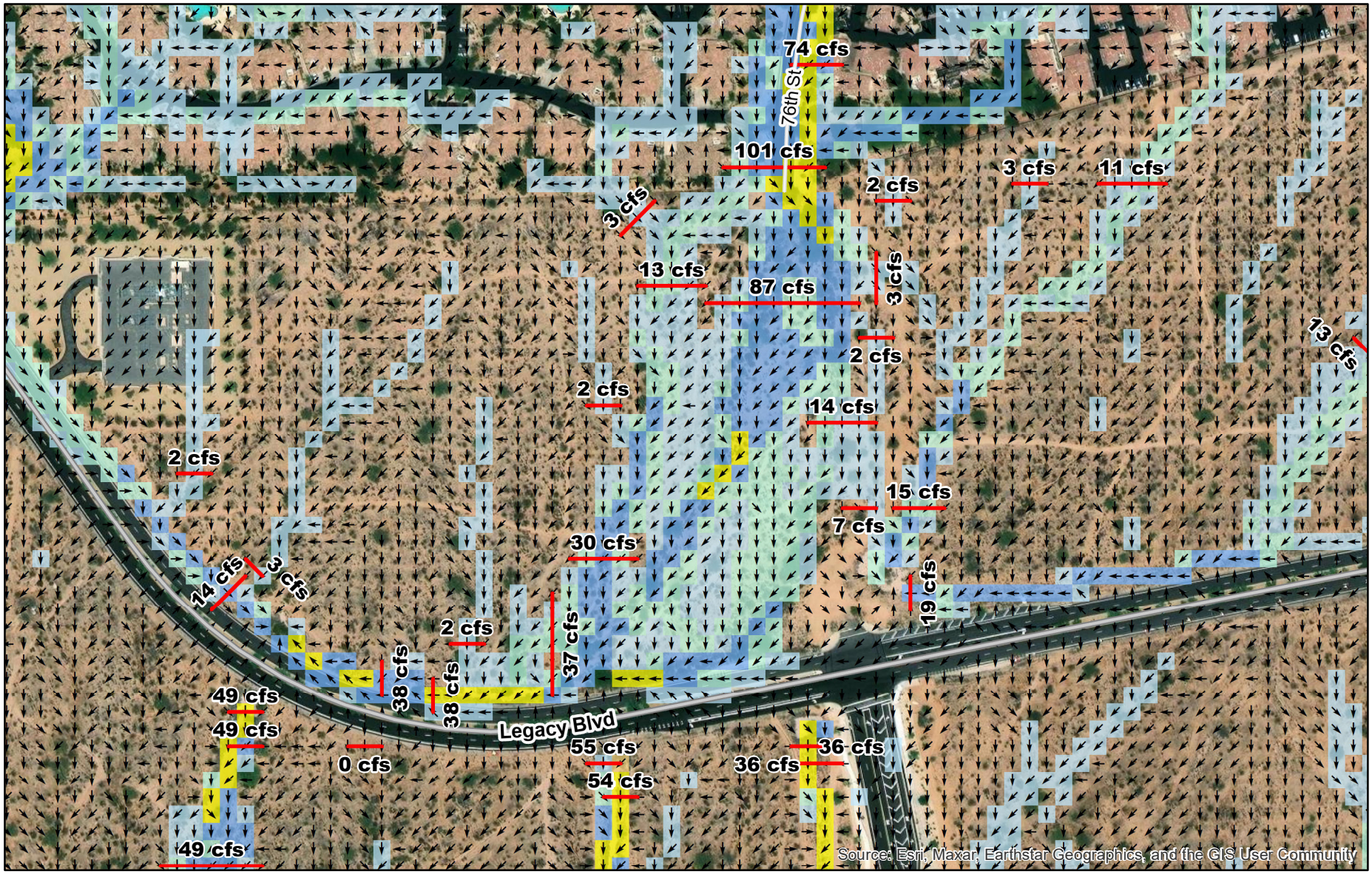
Profile Report
Engineering Profile - Profile - O1C (Legacy StormCAD model.stsw)



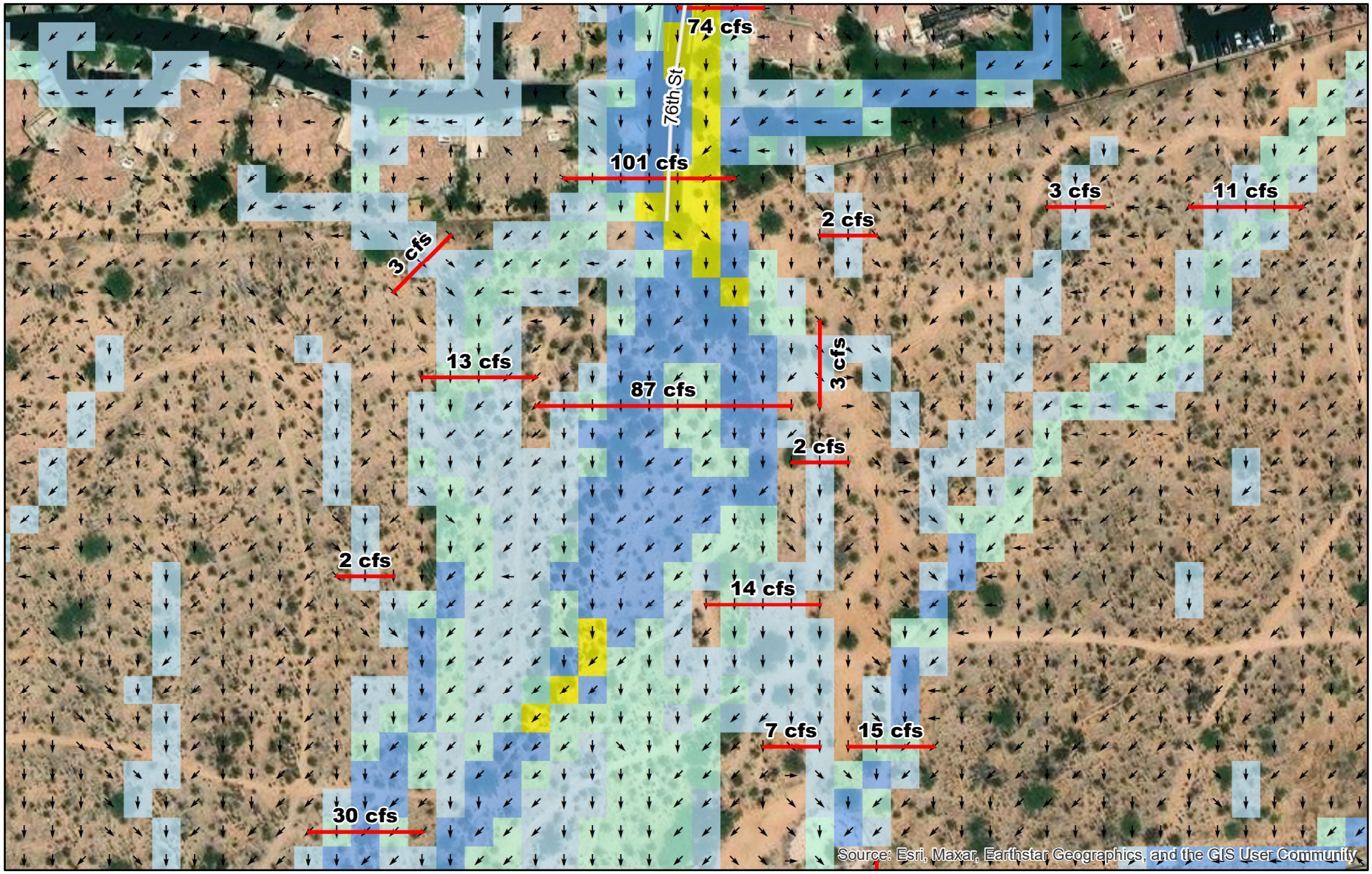
Profile Report

Engineering Profile - Profile - CB43 (Legacy StormCAD model.stsw)

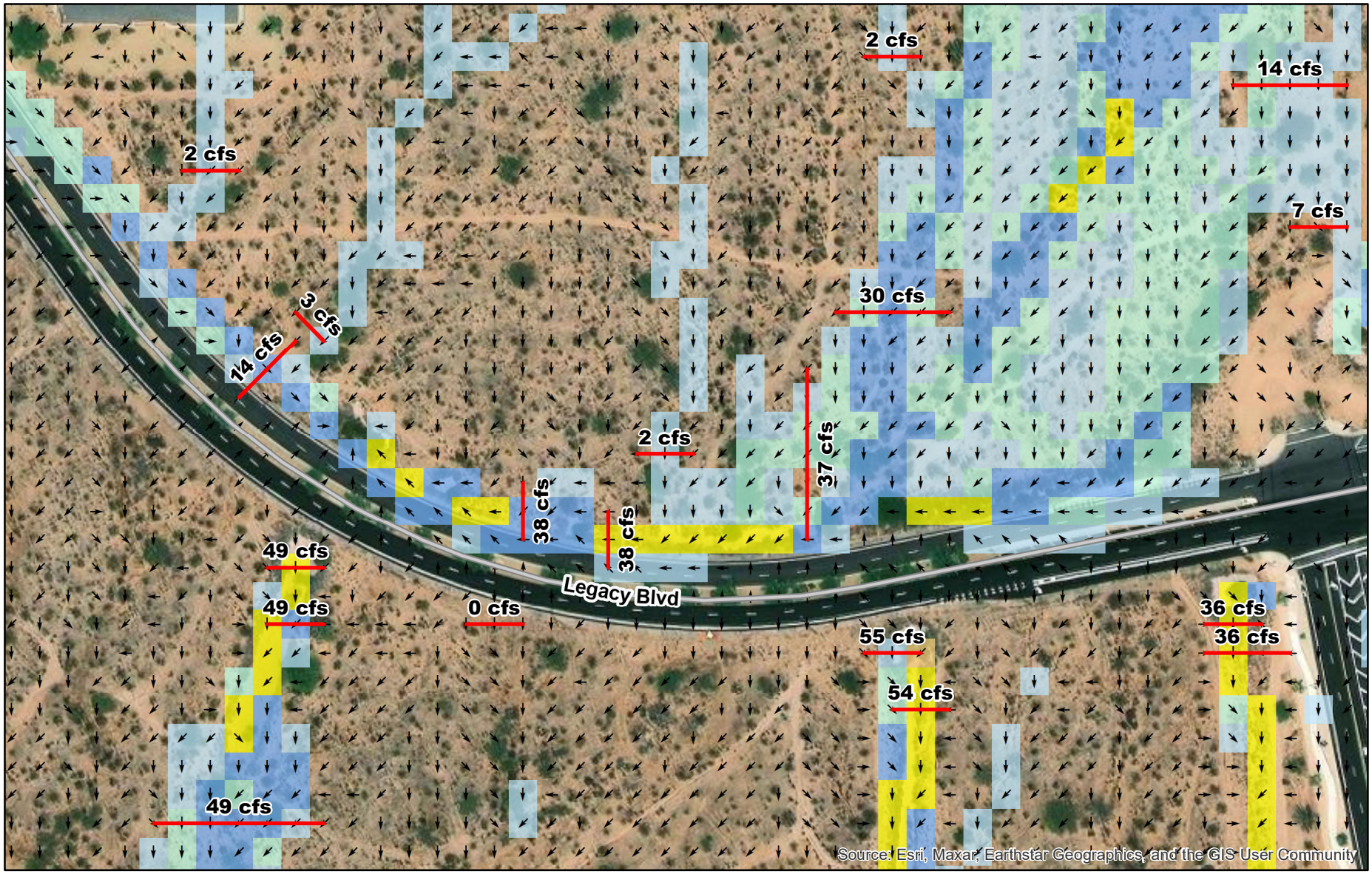




Kimley»Horn Expect More. Experience Better.	Maricopa County, AZ	Legacy & Miller
	Figure 1. Discharge Map	



Kimley»Horn Expect More. Experience Better.	Maricopa County, AZ	Legacy & Miller
	Figure 2. Discharge Map	



Kimley»Horn Expect More. Experience Better.	Maricopa County, AZ	Legacy & Miller
	Figure 3. Discharge Map	

Appendix D – Figures



FIGURE 1: CONTEXT AERIAL PLAN

Kimley»Horn

K:\PHX_Civil\291878000 - Legacy & Miller\CADD\Exhibits\2023-06-14 Context Aerial.dwg Jun 23, 2023 Hunter.Older

APN: 212-43-601
OWNER: VILLAGE AT GREYHAWK OWNERS ASSOCIATION
DOCUMENT NO. 2011-0525654 M.C.R.

APN: 212-36-009B
OWNER: ARIZONA PUBLIC SERVICE ROW 14-110191
DOCUMENT NO. NOD-61106

A PORTION OF APN 212-36-009D
OWNER: ARIZONA STATE LAND DEPT
DOCUMENT NO. 1996-0355065 M.C.R.

MILLER ROAD

EXST. OPEN CHANNEL

Q100=101 CFS

PROPERTY LINE

N87°27'58"E
913.29'

L=324.59'
R=845.00'

N0°01'04"E
365.64'

N0°00'34"W
2640.67'

N11°04'14"W
418.43'

EXST. RETENTION AREA

LEGACY BOULEVARD

N0°02'50"E
349.10'

EXST. OPEN CHANNEL

Q100=14 CFS

EXST. RETENTION AREA

N31°53'02"E
16.01'

S59°41'09"E
40.02'

S28°45'36"W
16.01'

R=750.00'
L=62.17'

EXST. H.W.

EXST. 29"X45" ELLIPTICAL CONCRETE PIPE CULVERT

EXST. CATCH BASIN

EXST. H.W.

Q100=49 CFS

S89°57'54"E
2640.94'

R=750.00'
L=521.63'

N78°54'38"E
25.00'

N11°05'22"W
20.00'

EXST. H.W.

S11°05'22"E
20.00'

N78°54'38"E
86.94'

N78°54'38"E
26.95'

EXST. 29"X45" ELLIPTICAL CONCRETE PIPE CULVERT

EXST. H.W.

Q100=55 CFS

EXST. DIRT ROAD

EXST. BOX CULVERT

N78°54'38"E
260.40'

PROPERTY LINE

EXST. 10'X3' CONCRETE BOX CULVERT

N33°44'18"E
43.44'

N22°27'20"E
43.42'

EXST. HEADWALL

Q100=55 CFS

MILLER ROAD

GRAPHIC SCALE IN FEET
0 30 60 120

NORTH

FIGURE 2: EXISTING CONDITIONS EXHIBIT

Kimley»Horn

K:\PHX_Civil\291878000 - Legacy & Miller\CADD\Exhibits\Existing Conditions.dwg Jun 23, 2023 madelaine.haynie

LEGEND

- PROPOSED CONTOUR
- EXISTING CONTOURS
- DRAINAGE AREA ID
- DRAINAGE AREA BOUNDARY
- INLET AREA BOUNDARY
- DRAINAGE FLOW DIRECTION

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

FIGURE 3: DRAINAGE AREA MAP

Kimley»Horn

K:\PHX_Civil\291878000 - Legacy & Miller\CADD\8780000DR.dwg Jun 23, 2023 Hunter.Older

REV	DESCRIPTION	BY	DATE	APPR

GRADING AND DRAINAGE CONSTRUCTION NOTES

1. NYLOPLAST LANDSCAPE AREA DRAIN, GRATE AND INVERT ELEVATIONS PER PLAN.
2. HDPE STORM DRAIN PIPE, LENGTH, SIZE, AND SLOPE PER PLAN.
3. HDPE STORM DRAIN BEND, INVERT AND ANGLE PER PLAN. SIZE TO MATCH ADJOINING PIPES.
4. HDPE STORM DRAIN TEE, INVERTS PER PLAN. SIZE TO MATCH ADJOINING PIPES.
8. 48" STORM DRAIN MANHOLE, PER MAG STD DET 520.
9. TYPE 'E' CATCH BASIN PER MAG STD DET 534, GRATE AND INVERT ELEVATIONS PER PLAN.
15. 3' WIDE CONCRETE VALLEY GUTTER.

NOTES:

1. ADD 1500' TO ALL ELEVATIONS.
2. ADD 0.5' TO PAVEMENT (P) ELEVATIONS TO OBTAIN TOP OF CURB ELEVATIONS, UNLESS OTHERWISE NOTED.
3. ALL SPOT ELEVATIONS ARE FINISHED GRADE PAVEMENT (P), GUTTER/GRATE (G), OR SIDEWALK (SW) ELEVATIONS UNLESS OTHERWISE NOTED.

CIVIL ENGINEER

KIMLEY-HORN
7740 N. 16TH STREET
SUITE 300
PHOENIX, AZ 85020
PH: (602) 944-5500
CONTACT: GARRETT FRAME, PE

DEVELOPER/OWNER

THE DINERSTEIN COMPANY
1010 S. COAST HIGHWAY 101, STE 106
ENCINITAS, CA 92024

LAND SURVEYOR

SURVEY INNOVATION GROUP, INC
22425 N. 16TH STREET, SUITE 1
PHOENIX, ARIZONA 85024
PH: (480) 922-0780
CONTACT: MICHAEL A. BANTA, RLS

ARCHITECT

KTGY ARCHITECTURE + PLANNING
17911 VON KARMAN AVE, STE 200
IRVINE, CA 92614
PH: (949) 851-2133

FLOOD INFORMATION

ACCORDING TO THE FLOOD INSURANCE RATE MAP #04013C1320 L, DATED 10/16/2013, THIS PROPERTY IS LOCATED IN FLOOD ZONE "AO" IS DEFINED AS AREAS WITH BASE FLOOD ELEVATION OR DEPT. (DEPTH 1 FEET)(VEL 3 FEET/SECOND)

LEGEND

- PROPERTY LINE
- RIGHT OF WAY LINE
- STREET CENTERLINE
- EASEMENT LINE
- S — EXISTING SEWER MAIN
- W — EXISTING WATER MAIN
- W — PROPOSED WATER MAIN
- S — PROPOSED SEWER MAIN
- PROPOSED STORM DRAIN
- HP — HIGH POINT
- 12 — PROPOSED CONTOUR
- 12 — EXISTING CONTOURS
- 10.00 P — PROPOSED PAVEMENT SPOT ELEVATION
- 10.00 P — EXISTING SPOT ELEVATION
- EXISTING SANITARY SEWER MANHOLE
- EXISTING FIRE HYDRANT
- PROPOSED FIRE HYDRANT
- PROPOSED CATCH BASIN

BENCHMARK

PER SURVEY INNOVATION GROUP, THE BENCHMARK IS:
FOUND 2 1/2" STEEL PIPE 0.15' UP WITH 3 1/4" BLM BRASS CAP STAMPED "T4N R4E 1/4 S26 S35 1995"

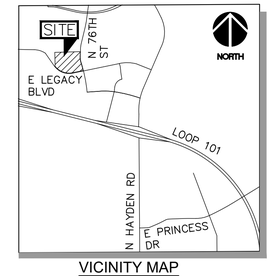
ELEVATION = 1598.718 (NAD83)

BASIS OF BEARING

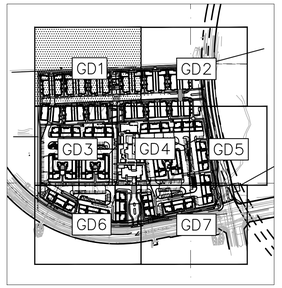
PER SURVEY INNOVATION GROUP, THE BASIS OF BEARING IS THE SOUTH LINE OF THE SOUTHEAST QUARTER OF SECTION 26, TOWNSHIP 4 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, AS SHOWN IN BOOK 693, PAGE 3 MARICOPA COUNTY RECORDS.

SAID LINE BEARS SOUTH 89 DEGREES 58 MINUTES 20 SECONDS EAST.

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



VICINITY MAP
SCOTTSDALE, AZ
N.T.S.

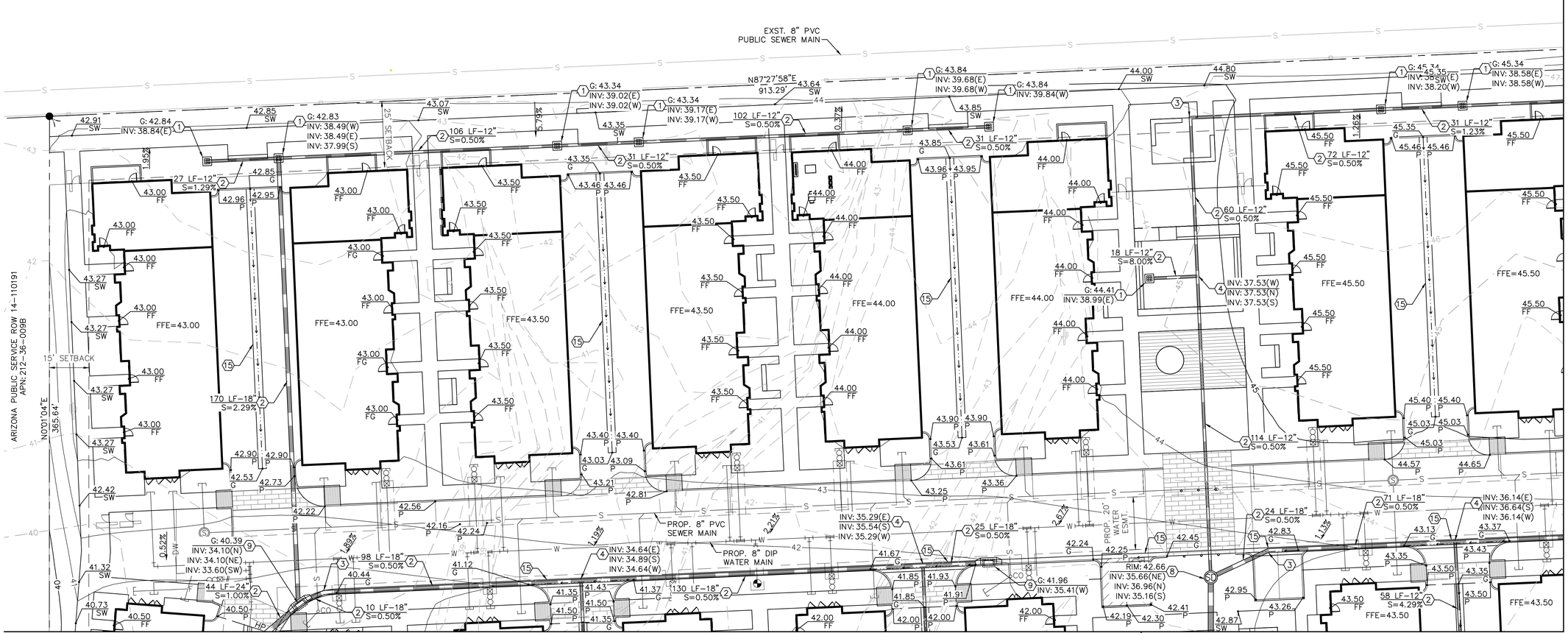


KEY MAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

APN 212-43-601
VILLAGE AT GREYHAWK OWNERS ASSOCIATION
DOCUMENT NO. 2011-0525654 M.C.R.
ZONING: R-5



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7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

Kimley»Horn

NWC LEGACY BLVD AND MILLER ROAD

PRELIMINARY GRADING PLAN

SCOTTSDALE, ARIZONA

PROJECT No.	291878000
SCALE (H):	1"=20'
SCALE (V):	NONE
DRAWN BY:	HDO
DESIGN BY:	RMH
CHECK BY:	CGF
DATE:	06/23/23

Registered Professional Engineer
CERTIFICATE NO.
64329
C. GARRETT FRAME
Date Signed 06/23/23
ARIZONA, USA
Expires 06/30/25

291878000Pre-GD.dwg

GD1
1 OF 7 SHEETS

GRADING AND DRAINAGE CONSTRUCTION NOTES

(1) NYLOPLAST LANDSCAPE AREA DRAIN, GRATE AND INVERT ELEVATIONS PER PLAN.

(2) HDPE STORM DRAIN PIPE, LENGTH, SIZE, AND SLOPE PER PLAN.

(3) HDPE STORM DRAIN BEND, INVERT AND ANGLE PER PLAN. SIZE TO MATCH ADJOINING PIPES.

(4) HDPE STORM DRAIN TEE, INVERTS PER PLAN. SIZE TO MATCH ADJOINING PIPES.

(5) TYPE 'D' CATCH BASIN PER MAG STD DET 533. GRATE AND INVERT ELEVATIONS PER PLAN.

(8) 48" STORM DRAIN MANHOLE, PER MAG STD DET 520.

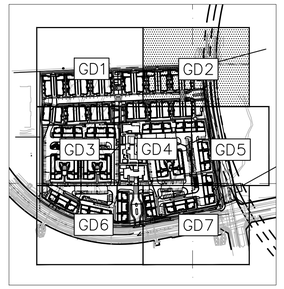
(9) TYPE 'E' CATCH BASIN PER MAG STD DET 534, GRATE AND INVERT ELEVATIONS PER PLAN.

(15) 3' WIDE CONCRETE VALLEY GUTTER.

(17) CATCH BASIN PER ADOT ROADWAY STD DWG C-15.80. GRATE AND INVERT ELEVATIONS PER PLAN.

NOTES:

1. ADD 1500' TO ALL ELEVATIONS.
2. ADD 0.5' TO PAVEMENT (P) ELEVATIONS TO OBTAIN TOP OF CURB ELEVATIONS, UNLESS OTHERWISE NOTED.
3. ALL SPOT ELEVATIONS ARE FINISHED GRADE PAVEMENT (P), GUTTER/GRATE (G), OR SIDEWALK (SW) ELEVATIONS UNLESS OTHERWISE NOTED.



KEY MAP
N.T.S.

APN 212-43-601
VILLAGE AT GREYHAWK OWNERS ASSOCIATION
DOCUMENT NO. 2011-0525654 M.C.R.
ZONING: R-5

EXST. 8" PUBLIC SEWER MAIN

EXST. 12" PVC PUBLIC WATER MAIN

EXST. 8" PVC PUBLIC SEWER MAIN

N75°08'15"E 323.69'

35.04'
S87°27'58"W

N87°27'58"E 913.29'

25' SETBACK

18 LF-48" S=1.00%
RIM: 47.20
INV: 39.17(E)
INV: 39.07(S)

51 LF-48" S=1.00%

284 LF-48" S=1.19%

PROP. 12" PVC PUBLIC WATER MAIN

MILLER RD

PROP. 8" PUBLIC SEWER MAIN

20' SETBACK

C=321.47'
CB=S51°24'47"E
L=322.03'
R=1575.00'
Δ=11°42'54"

C=324.07'
CB=S57°25'06"E
L=325.58'
R=1575.00'
Δ=11°51'20"

FFE=45.50

FFE=46.00

FFE=44.00

FFE=44.50

PROP. 8" PVC SEWER MAIN

130 LF-18" S=0.50%

25 LF-18" S=0.50%

PROP. 20' WATER ESMT.

PROP. 8" DIP WATER MAIN

58 LF-12" S=0.50%

12 LF-12" S=0.50%

104 LF-12" S=0.50%

58 LF-12" S=4.03%

58 LF-12" S=3.77%

102 LF-12" S=1.23%

31 LF-12" S=1.23%

MATCH LINE: SEE SHEET GD1

MATCH LINE: SEE SHEET GD4

MATCH LINE: SEE SHEET GD5

NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

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

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7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

Kimley»Horn

NWC LEGACY BLVD AND MILLER ROAD

PRELIMINARY GRADING PLAN

SCOTTSDALE, ARIZONA

PROJECT No.	291878000
SCALE (H):	1"=20'
SCALE (V):	NONE
DRAWN BY:	HDO
DESIGN BY:	RMH
CHECK BY:	CGF
DATE:	06/23/23

Registered Professional Engineer (Civil)
CERTIFICATE NO.
64329
C. GARRETT FRAME
Date Signed 06/23/23
ARIZONA, USA
Expires 06/30/24

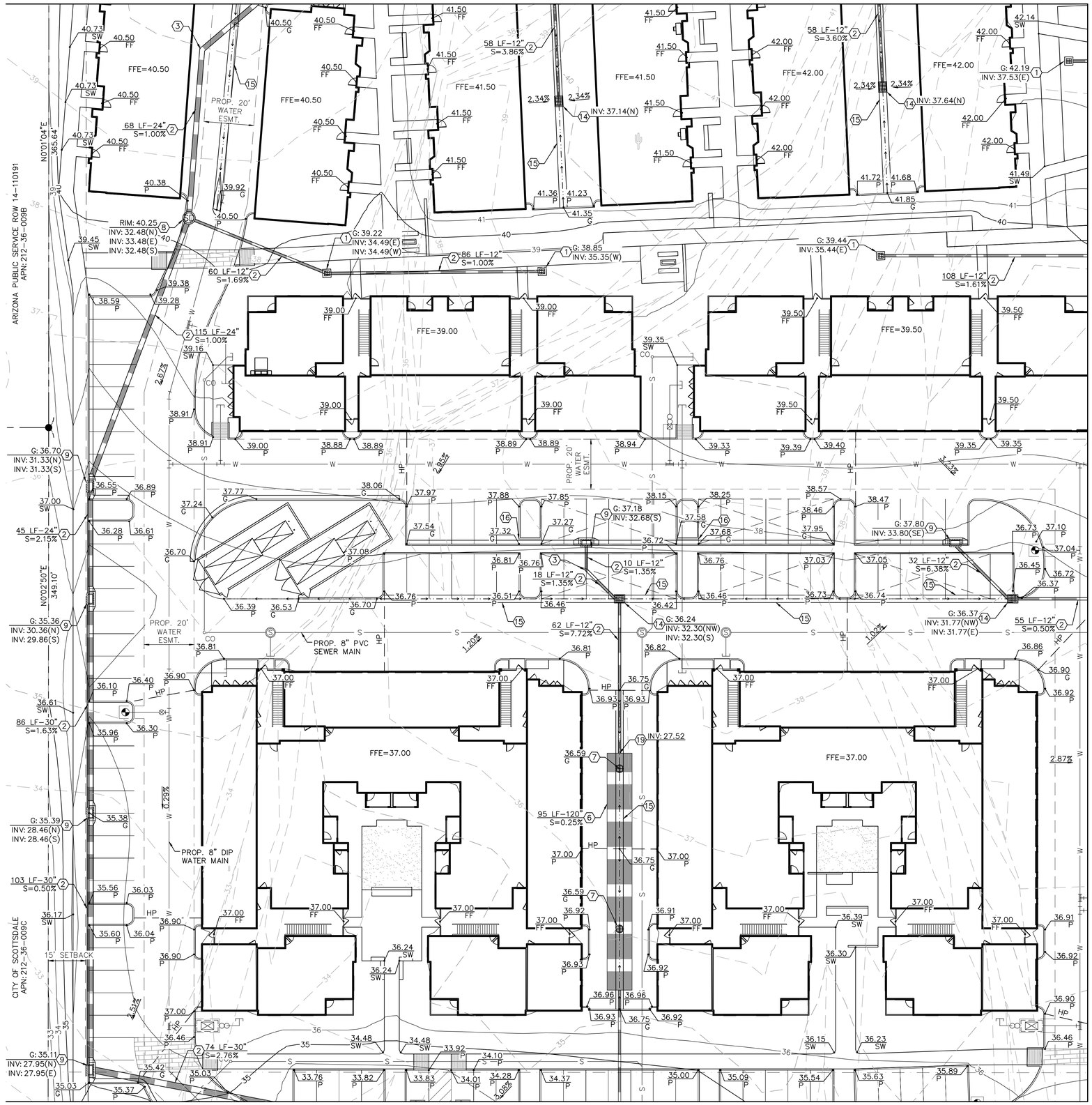
878000Pre-GD.dwg

GD2

2 OF **7** SHEETS

REV	DESCRIPTION	BY	DATE	APPR.
01				

MATCH LINE: SEE SHEET GD1



MATCH LINE: SEE SHEET GD4

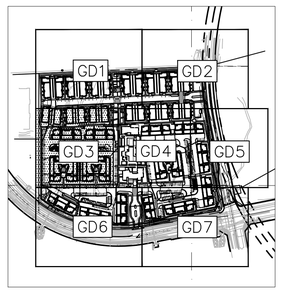
MATCH LINE: SEE SHEET GD6

GRADING AND DRAINAGE CONSTRUCTION NOTES

1. NYLOPLAST LANDSCAPE AREA DRAIN, GRATE AND INVERT ELEVATIONS PER PLAN.
2. HDPE STORM DRAIN PIPE, LENGTH, SIZE, AND SLOPE PER PLAN.
3. HDPE STORM DRAIN BEND, INVERT AND ANGLE PER PLAN. SIZE TO MATCH ADJOINING PIPES.
6. 10' DIAMETER CMP UNDERGROUND RETENTION TANKS.
7. RETENTION TANK ACCESS RISER.
8. 48" STORM DRAIN MANHOLE, PER MAG STD DET 520.
9. TYPE 'E' CATCH BASIN PER MAG STD DET 534, GRATE AND INVERT ELEVATIONS PER PLAN.
14. TYPE 'F' CATCH BASIN PER MAG STD DET 535, GRATE AND INVERT ELEVATIONS PER PLAN.
15. 3' WIDE CONCRETE VALLEY GUTTER.
16. PROPOSED 2' CONCRETE DRAINAGE CHANNEL.
19. STORM DRAIN CONNECTION TO UNDERGROUND RETENTION TANK. INVERT PER PLAN.

NOTES:

1. ADD 1500' TO ALL ELEVATIONS.
2. ADD 0.5' TO PAVEMENT (P) ELEVATIONS TO OBTAIN TOP OF CURB ELEVATIONS, UNLESS OTHERWISE NOTED.
3. ALL SPOT ELEVATIONS ARE FINISHED GRADE PAVEMENT (P), GUTTER/GRATE (G), OR SIDEWALK (SW) ELEVATIONS UNLESS OTHERWISE NOTED.



KEY MAP
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

REV	DESCRIPTION	BY	DATE	APPR.

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NWC LEGACY BLVD AND MILLER ROAD
SCOTTSDALE, ARIZONA

PRELIMINARY GRADING PLAN

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GD3
3 OF 7 SHEETS

MATCH LINE: SEE SHEET GD1

MATCH LINE: SEE SHEET GD2

MATCH LINE: SEE SHEET GD3

MATCH LINE: SEE SHEET GD5

MATCH LINE: SEE SHEET GD6

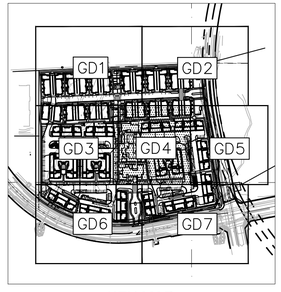
MATCH LINE: SEE SHEET GD7

GRADING AND DRAINAGE CONSTRUCTION NOTES

1. NYLOPLAST LANDSCAPE AREA DRAIN, GRATE AND INVERT ELEVATIONS PER PLAN.
2. HDPE STORM DRAIN PIPE, LENGTH, SIZE, AND SLOPE PER PLAN.
3. HDPE STORM DRAIN BEND, INVERT AND ANGLE PER PLAN. SIZE TO MATCH ADJOINING PIPES.
4. HDPE STORM DRAIN TEE, INVERTS PER PLAN. SIZE TO MATCH ADJOINING PIPES.
8. 48" STORM DRAIN MANHOLE, PER MAG STD DET 520.
9. TYPE 'E' CATCH BASIN PER MAG STD DET 534, GRATE AND INVERT ELEVATIONS PER PLAN.
14. TYPE 'F' CATCH BASIN PER MAG STD DET 535, GRATE AND INVERT ELEVATIONS PER PLAN.
15. 3' WIDE CONCRETE VALLEY GUTTER.
16. PROPOSED 2' CONCRETE DRAINAGE CHANNEL.

NOTES:

1. ADD 1500' TO ALL ELEVATIONS.
2. ADD 0.5' TO PAVEMENT (P) ELEVATIONS TO OBTAIN TOP OF CURB ELEVATIONS, UNLESS OTHERWISE NOTED.
3. ALL SPOT ELEVATIONS ARE FINISHED GRADE PAVEMENT (P), GUTTER/GRADE (G), OR SIDEWALK (SW) ELEVATIONS UNLESS OTHERWISE NOTED.



KEY MAP
N.T.S.

NORTH

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NWC LEGACY BLVD AND MILLER ROAD

PRELIMINARY GRADING PLAN

SCOTTSDALE, ARIZONA

Registered Professional Engineer (Civil)
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ARIZONA, U.S.A.
EXPIRES 06/30/25

PROJECT No.	291878000
SCALE (H):	1"=20'
SCALE (V):	NONE
DRAWN BY:	HDO
DESIGN BY:	RMH
CHECK BY:	HDO
DATE:	06/23/23

278000Pre-GD.dwg

GD4
4 OF 7 SHEETS

REV	DESCRIPTION	BY	DATE	APPR.

MATCH LINE: SEE SHEET GD2

MATCH LINE: SEE SHEET GD4

MATCH LINE: SEE SHEET GD7



GRADING AND DRAINAGE CONSTRUCTION NOTES

(2) HDPE STORM DRAIN PIPE, LENGTH, SIZE, AND SLOPE PER PLAN.

(8) 48" STORM DRAIN MANHOLE, PER MAG STD DET 520.

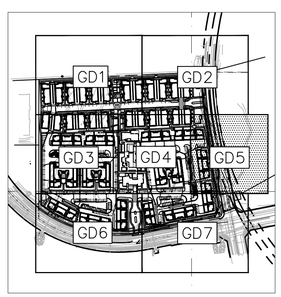
(9) TYPE 'E' CATCH BASIN PER MAG STD DET 534, GRATE AND INVERT ELEVATIONS PER PLAN.

(15) 3' WIDE CONCRETE VALLEY GUTTER.

(16) PROPOSED 2' CONCRETE DRAINAGE CHANNEL.

NOTES:

1. ADD 1500' TO ALL ELEVATIONS.
2. ADD 0.5' TO PAVEMENT (P) ELEVATIONS TO OBTAIN TOP OF CURB ELEVATIONS, UNLESS OTHERWISE NOTED.
3. ALL SPOT ELEVATIONS ARE FINISHED GRADE PAVEMENT (P), GUTTER/GRATE (G), OR SIDEWALK (SW) ELEVATIONS UNLESS OTHERWISE NOTED.



KEY MAP
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PRELIMINARY GRADING PLAN

SCOTTSDALE, ARIZONA

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Expires 09/30/24

291878000Pre-GD.dwg

GD5
5 OF 7 SHEETS

MATCH LINE: SEE SHEET GD3

MATCH LINE: SEE SHEET GD4

MATCH LINE: SEE SHEET GD7

CITY OF SCOTTSDALE
APN: 212-36-009C

15' SETBACK

MAINT. BUILDING FFE=34.50

34.50 FF

PROP. 20' WATER ESMT.

PROP. 8" PVC SEWER MAIN

PROP. 8" DIP WATER MAIN

57 LF–30" S=2.76%

95 LF–120" S=0.25%

89 LF–18" S=1.44%

19 LF–36" S=0.35%

142 LF–36" S=0.77%

96 LF–12" S=1.00%

12 LF–12" S=8.00%

20 LF–12" S=1.00%

12 LF–24" S=–1.00%

54 LF–24" S=–1.00%

20 LF–24" S=22.55%

92 LF–120" S=0.25%

23 LF–12" S=1.00%

7 LF–24" S=8.00%

15 LF–24" S=13.62%

202 LF–36" S=0.77%

225 LF–36" S=0.77%

47 LF–30" S=0.50%

68 LF–30" S=4.04%

88 LF–120" S=0.25%

51 LF–12" S=1.35%

12 LF–12" S=1.35%

48 LF–12" S=1.35%

Δ=4°44'57"
R=750.00'
L=62.17'
CB=S53°44'29"E
C=62.15'

Δ=39°50'58"
R=750.00'
L=521.63'
CB=S81°09'53"E
C=511.18'

N31°53'02"E 16.01'

N0°02'50"E 61.22'

S59°41'09"E 40.07'

S28°35'16"W 16.01'

BASIN A
HW= –
BTM= –
Vreq= 22,291 CF
Vprov= 22,384 CF

BASIN B
HW= –
BTM= –
Vreq= 14,118 CF
Vprov= 14,137 CF

FFE=33.50

FFE=33.00

RIM: 33.69
INV: 24.86(NW)
INV: 23.36(SE)
INV: 23.36(SW)

RIM: 33.22
INV: 26.26(N)
INV: 29.52(S)

RIM: 33.47
INV: 27.23(N)
INV: 27.13(S)

INV: 24.34
INV: 27.15(SW)
INV: 26.17
INV: 18.11
INV: 26.78(S)
INV: 24.40
INV: 23.46
INV: 24.96(N)
INV: 24.46(E)
INV: 24.46(W)
INV: 25.44(E)
INV: 28.56(S)
INV: 26.52(N)
INV: 26.02(E)
INV: 26.02(W)
INV: 26.15
INV: 27.47(W)

G: 33.14
G: 32.16
G: 32.31
G: 32.72
G: 31.47

EXST. STORM DRAIN PIPE

EXST. 20" DIP NON–POTABLE WATER MAIN

EXST. 16" DIP PUBLIC WATER MAIN

EXST. HEADWALL

E LEGACY BLVD

EXST. 50' R\W

EXST. 8" PVC PUBLIC SEWER MAIN

EXST. GAS LINE

PROP. LEFT TURN LANE

EXST. 12" PVC PUBLIC SEWER MAIN

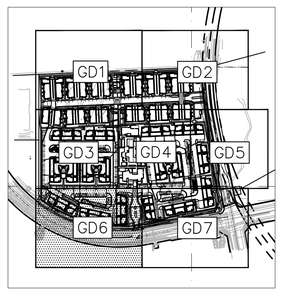
20' SETBACK

GRADING AND DRAINAGE CONSTRUCTION NOTES

1. NYLOPLAST LANDSCAPE AREA DRAIN, GRATE AND INVERT ELEVATIONS PER PLAN.
2. HDPE STORM DRAIN PIPE, LENGTH, SIZE, AND SLOPE PER PLAN.
3. HDPE STORM DRAIN BEND, INVERT AND ANGLE PER PLAN. SIZE TO MATCH ADJOINING PIPES.
4. HDPE STORM DRAIN TEE, INVERTS PER PLAN. SIZE TO MATCH ADJOINING PIPES.
6. 10' DIAMETER CMP UNDERGROUND RETENTION TANKS.
7. RETENTION TANK ACCESS RISER.
8. 48" STORM DRAIN MANHOLE, PER MAG STD DET 520.
9. TYPE 'E' CATCH BASIN PER MAG STD DET 534, GRATE AND INVERT ELEVATIONS PER PLAN.
10. MAXWELL PLUS OR APPROVED EQUAL DUAL CHAMBER DRYWELL.
13. CONNECT TO EXISTING STORM DRAIN PIPE, INVERT PER PLAN.
15. 3' WIDE CONCRETE VALLEY GUTTER.
16. PROPOSED 2' CONCRETE DRAINAGE CHANNEL.
19. STORM DRAIN CONNECTION TO UNDERGROUND RETENTION TANK. INVERT PER PLAN.

NOTES:

1. ADD 1500' TO ALL ELEVATIONS.
2. ADD 0.5' TO PAVEMENT (P) ELEVATIONS TO OBTAIN TOP OF CURB ELEVATIONS, UNLESS OTHERWISE NOTED.
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KEY MAP
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NORTH

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APPR. | DATE | BY | DESCRIPTION | REV

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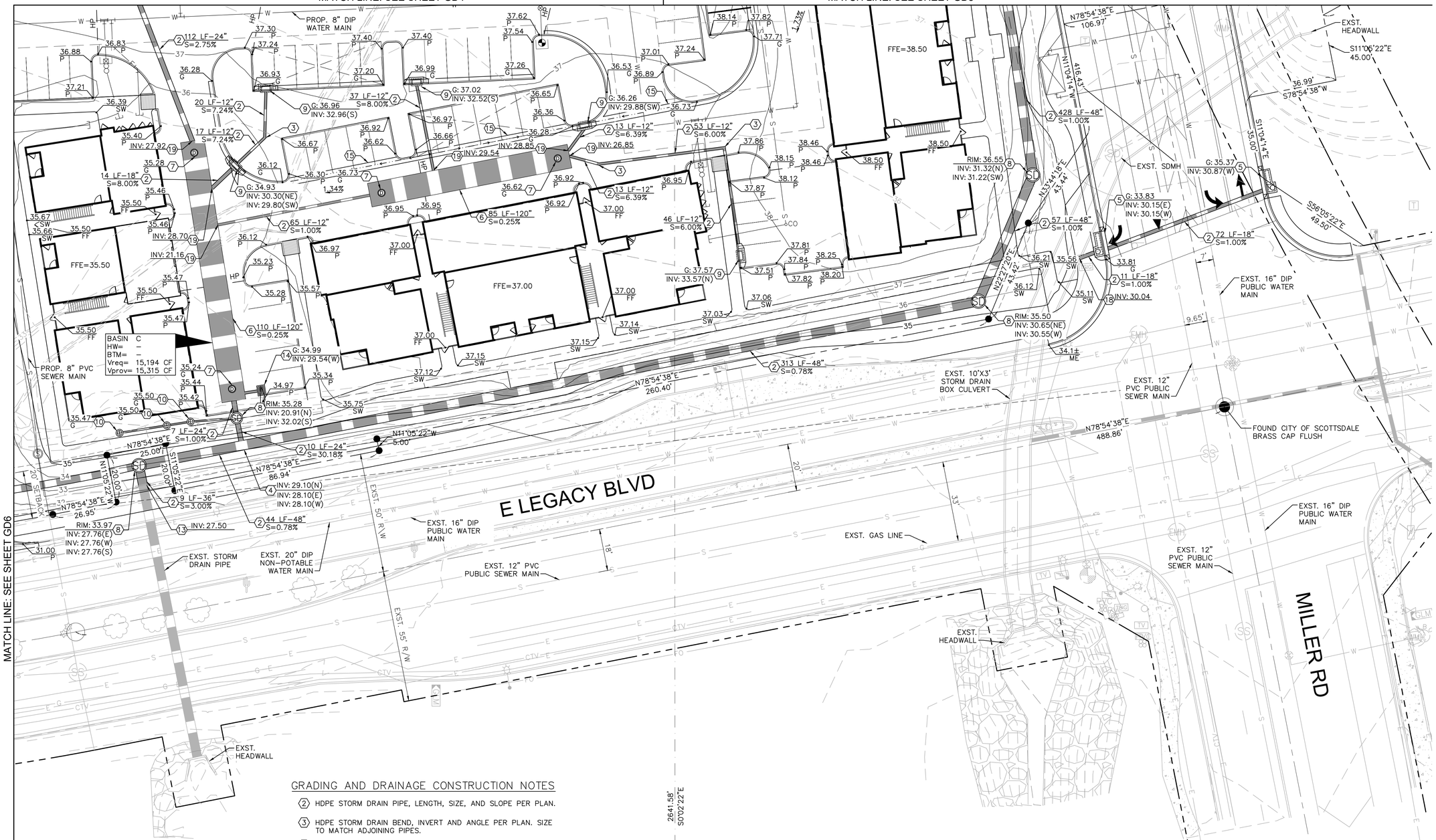
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GD6
6 OF 7 SHEETS

MATCH LINE: SEE SHEET GD4

MATCH LINE: SEE SHEET GD5

MATCH LINE: SEE SHEET GD6



GRADING AND DRAINAGE CONSTRUCTION NOTES

(2) HDPE STORM DRAIN PIPE, LENGTH, SIZE, AND SLOPE PER PLAN.

(3) HDPE STORM DRAIN BEND, INVERT AND ANGLE PER PLAN. SIZE TO MATCH ADJOINING PIPES.

(4) HDPE STORM DRAIN TEE, INVERTS PER PLAN. SIZE TO MATCH ADJOINING PIPES.

(5) TYPE 'D' CATCH BASIN PER MAG STD DET 533. GRATE AND INVERT ELEVATIONS PER PLAN.

(6) 10' DIAMETER CMP UNDERGROUND RETENTION TANKS.

(7) RETENTION TANK ACCESS RISER.

(8) 48" STORM DRAIN MANHOLE, PER MAG STD DET 520.

(9) TYPE 'E' CATCH BASIN PER MAG STD DET 534, GRATE AND INVERT ELEVATIONS PER PLAN.

(13) CONNECT TO EXISTING STORM DRAIN PIPE, INVERT PER PLAN.

(14) TYPE 'F' CATCH BASIN PER MAG STD DET 535, GRATE AND INVERT ELEVATIONS PER PLAN.

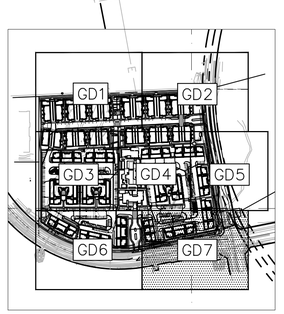
(15) 3' WIDE CONCRETE VALLEY GUTTER.

(18) BORE AND CONNECT TO EXISTING BOX CULVERT. INVERT PER PLAN.

(19) STORM DRAIN CONNECTION TO UNDERGROUND RETENTION TANK. INVERT PER PLAN.

NOTES:

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GD7
7 OF 7 SHEETS