MASTER WASTEWATER REPORT UPDATE
FOR
EASTMARK

Revised May 14, 2014
Revised December 17, 2013
Revised May 17, 2013
Revised February 4, 2013
Revised December 20, 2011
April 22, 2011
WP# 144173

CITY OF MESA
APPROVED
By
Date

REVIEWED BY
CITY STAFF
5/16/14 DATE
BY

WOOD/PATEL
MISSION: CLIENT SERVICE™

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EASTMARK

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DMB® Master Developer Approval — EASTMARK.
Date 05/15/14
ERIC J. TUNE
SR. PROJECT MANAGER

Submitted to:

City of Mesa
55 North Center Street
P.O. Box 1466
Mesa, Arizona 85211-1466
Phone: (480) 644-3258

Prepared for:

DMB Mesa Proving Grounds, LLC
7600 East Doubletree Ranch Road
Suite 300
Scottsdale, Arizona 85258
Phone: (480) 367-7000

Registered Professional Engineer (Civil) — CERTIFICATE NO. 53408 — DANIEL W. MATTHEWS — Date Signed 05-14-14 — ARIZONA, U.S.A.
EXPIRES 06-30-2015

Prepared By:

Wood, Patel & Associates, Inc.
2220 South Country Club Drive
Suite 101
Phoenix, Arizona 85210
Phone: (480) 834-3300
Fax: (602) 335-8580
Website: www.woodpatel.com

WOOD/PATEL
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TABLES

PLATES

EXPIRES 06-30-2015

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Registered Professional Engineer (Civil)
CERTIFICATE NO. 53408
DANIEL W. MATTHEWS
Date Signed 05-14-14
ARIZONA, U.S.A.

EXPIRES 06-30-2015

EXECUTIVE SUMMARY

This report supersedes the *Master Wastewater Report Update for Eastmark*, dated December 17, 2013, and has been prepared to specifically address revisions to the proposed wastewater infrastructure within Development Unit 3/4 (DU 3/4), Development Unit 5 (DU 5), and Development Unit 5 East (DU 5E). More detailed land use planning within DU 3/4, DU 5, and DU 5E has been prepared and provided to Wood, Patel & Associates, Inc. (Wood/Patel) by DMB Mesa Proving Grounds, LLC. DU 3/4 and DU 5E are concurrently planned as the next phases of development within Eastmark. DU 3/4 is bounded by Ray Road to the south from Ellsworth Rd. to Inspirian Pkwy, Inspirian Pkwy on the east from Ray Road to Point Twenty-Two Blvd, Point Twenty-Two Blvd on the south from Inspirian Pkwy to Eastmark Pkwy, Eastmark Pkwy on the east from Point Twenty Two Blvd to Warner Road, Warner Road on the north, and Ellsworth Road on the east. DU 5E is bounded by Elliot Road to the north, future Development Unit 6 North to the east, and future Development Unit 5 on the south and west. Changes to the *Master Wastewater Report Update for Eastmark* include:

- Revised wastewater flow criteria for Development Units that have not previously been master planned. The criteria have been revised based on 2012 City of Mesa Engineering and Design Standards for residential land uses and population based criteria for non-residential uses. The population based criteria was developed through research of local municipal standards and through City provided water/sewer meter readings from actual land uses.

- Revised land uses within DU 3/4 and DU 5E were incorporated to reflect more detailed planning. Minor adjustments were made to land uses within DU's that have not undergone detailed planning.

- Revised wastewater collection system layout and pipe sizes within DU's 8 & 9 to be consistent with the approved *Master Wastewater Report for Development Units 8 & 9 at Eastmark*, dated January 15, 2014. Additionally, pipe segment R34 to R33 was revised from a 12-inch sewer to a 15-inch sewer and segment R38 to R34 was revised from a 10-inch sewer to a 12-inch sewer to reflect actual sewer design prepared by EPS Group.

- Revised wastewater demand for the portion of DU 5 affected by eliminating the golf course and subsequent land use updates within these Development Units.

- Wood/Patel received final lot counts for DU 7 parcels which showed a reduction of lots from 2,129 dwelling units in previous master plans to 1,958 dwelling units within this update. The excess 171 units have been allocated to DU 5. Wastewater demands within DU 7 and DU 5 have been revised accordingly.

- Revised Elliot Sewer Basin to include DU 5E.

- Revised wastewater design flows and revised pipe sizes for DU's 1, 2, 3/4, 5, 5E, and 6 South.

- An additional peak wet-weather flow analysis was performed to evaluate pipe capacities downstream of a proposed Aquatic Center within DU 3/4, with additional sewer flow to drain an anticipated 450,000-gallon pool within 8 hours (938 gpm).

Refer to the attached location plan in Plate 1 – *Vicinity Map*.

1.0 INTRODUCTION

1.1 General Background and Project Location

The proposed Eastmark (Site) is anticipated to be an approximate 3,154-acre master planned community annexed into the City of Mesa (City). It is a Planned Community District (PCD) which is a mixed-use development that will include single-family residential, multi-family residential, urban mixed-use, commercial mixed-use, office, industrial, hotel, resort, various community uses, and open spaces.

This Master Wastewater Report Update has been prepared in accordance with Wood, Patel & Associates, Inc. (Wood/Patel's) understanding of the City's technical requirements for wastewater collection systems as applicable for Eastmark.

The Site is located within Sections 14, 15, 22, 23, 26, and 27 of Township 1 South, Range 7 East of the Gila and Salt River Meridian. The Site is bounded by Elliot Road to the north, the Pacific Proving Grounds on the south, Ellsworth Road to the west, and Signal Butte Road to the east (refer to Plate 1 – *Vicinity Map)*.

1.2 Scope of the Master Wastewater Report

The Master Wastewater Report presents wastewater design flows and sewer main sizes and locations as required to provide wastewater service to the Site during full build-out conditions. The purpose of this update is to provide a new sewer analysis reflecting more detailed land use planning for DU 3/4 and DU 5E. It is the goal of this Master Wastewater Report Update to identify the sewers required to serve the areas while meeting the requirements of the City's Engineering and Design Standards and City approved criteria for Eastmark.

The Site is being planned as a PCD. There are 9 development units that comprise the PCD. The *Master Wastewater Report for Eastmark* utilizes a Conceptual Land Use Plan, Development Unit Plan, and proposed densities provided by DMB Mesa Proving Grounds, LLC and TerraWest Communities.

Each development unit will require its own Development Unit Plan Wastewater Report, providing a more detailed analysis of the wastewater collection system. Each

Development Unit Master Wastewater Report will address changes in the development units and adjacent development units which may occur as development progresses and densities change. Updates to the Master Wastewater Report may be required if significant changes are made to the land uses and assumptions utilized to prepare this Report. Additionally, design criteria may change based on actual wastewater generation to calculate demand on the system in the future.

1.3 City of Mesa Wastewater Master Plan

The City of Mesa updated the City's Wastewater Master Plan in 2009. Updates were made to several sewers along Ellsworth Road and Williams Field Road to incorporate the proposed SR24 Freeway. This Report defines the Site to be within the Greenfield Water Reclamation Plant Drainage Area, where wastewater is collected and conveyed within the East Mesa Interceptor (EMI) to the Greenfield Water Reclamation Plant (GWRP). A reclaimed waterline provides treated flow from the GWRP to the Gila River Indian Community (GRIC).

1.4 Study Area and Development Units

The study area includes the Elliot, Warner, Ray, and Williams Field Sewer Drainage Basins, per the City of Mesa Wastewater Master Plan Update, 2009. For a detailed breakdown of modeled land use areas, please refer to the following:

- *Table 13– Overall Eastmark Modeled Land Use*
- *Plate 2 – Master Sewer Exhibit, Full Build-Out Condition*

1.5 Development Unit Master Plan Approvals

As each development unit is planned, this *Master Wastewater Report for Eastmark* shall be updated as a living document to reflect changes to the land use plan that would affect the full build-out wastewater collection system. Since the development of Eastmark spans over many years the criteria used to size the system has changed and will continue to change from time to time to account for better information and changes in technology. Each development unit shall be master planned, utilizing current approved criteria which accurately reflects wastewater generation on a master planned level for the entire community. The approvals of development unit wastewater master plans and corresponding criteria are as follows:

- DU 6 North – Approved report dated April 22, 2011 with 2007 City of Mesa wastewater criteria.
- DU 7 – Approved report dated December 20, 2011 with 2009 City of Mesa wastewater criteria.
- DU 7 – Revised and Reapproved report dated May 17, 2013 with 2009 City of Mesa wastewater criteria.
- DU 8 & 9 – Approved report dated February 4, 2013 with 2009 City of Mesa wastewater criteria.
- DU 8 & 9 – Revised and Reapproved report dated January 15, 2014 with 2009 City of Mesa wastewater criteria.
- DU 3 South - Approved report dated December 17, 2013 with 2009 City of Mesa wastewater criteria.
- DU 3/4 – DU master plan is currently being prepared and shall be submitted subsequently.
- DU 5 East – DU master plan is currently being prepared and shall be submitted subsequently.

1.6 Construction Phasing

This Master Wastewater Report presents the full build-out conditions of the Site. It is anticipated that sewer main construction will be phased to correspond with Development Unit Plans. A phasing plan will be presented in each Development Unit Master Report to show the improvements that must be constructed with each development unit to meet the City's requirements.

1.7 Basis of Design Reports for Specific Individual Developments

As development progresses within the Site, Basis of Design (BOD) reports are required for specific individual developments to ensure compliance with this Master Report and the Development Unit Master Report, and to identify significant variations in land use, wastewater flows, and the wastewater infrastructure needed to serve the parcel.

2.0 EXISTING CONDITIONS

2.1 Topographic Conditions

The Site consists of multiple automotive test tracks, a grouping of commercial/industrial buildings, and undisturbed desert. The Site has been utilized by General Motors as a desert automotive testing facility since the 1950's. General Motors has vacated the Site. The majority of the Site is surrounded by undeveloped desert along the northern, western, and southern boundaries. The Site is bordered on the east by two residential developments that have recently been constructed or are currently under construction, including Nova Vista and Mountain Horizons. The land generally slopes in a southwesterly direction at approximately 0.5 to 1 percent. The peak elevation within the Site is approximately 1,460 feet above mean sea level (MSL), located near the intersection of Signal Butte Road and Elliot Road. The lowest elevation within the Site is approximately 1,390 feet MSL, located near the Ray Road alignment and Ellsworth Road.

2.2 Existing Offsite Wastewater Infrastructure

Existing public wastewater infrastructure in the vicinity of the Site includes the following:

- An existing 12-inch gravity sewer located along Mountain Road between Elliot Road and Pecos Road.
- An existing 12-inch gravity sewer located along Signal Butte Road, between Elliot Road and Galveston Road.
- An existing 18-inch dry gravity sewer located along Warner Road within the Loop 202 Freeway right-of-way.
- The East Mesa Interceptor (EMI), which is approximately two and one-half miles (2 ½) west of the Site is an existing 54- and 66-inch gravity sewer line extending in a southerly direction parallel with the East Maricopa Floodway.
- A 27-inch and 30-inch gravity sewer located along Ray Road flowing east from Ellsworth Road and discharging to the EMI, and a 21-inch and 18-inch gravity sewer from Ellsworth Road to Signal Butte Road.
- An existing 24-inch gravity sewer along Elliot Road, from the former First Solar site at the southwest corner of Signal Butte Road and Elliot Road to the EMI in Ellsworth Road.

2.3 Onsite Wastewater Collection Systems

Existing public wastewater collection systems onsite include the following:

- An existing 30-inch gravity sewer traversing south to north, along the western portion of the former First Solar site at the southwest corner of Signal Butte Road and Elliot Road.
- An existing 18- and 21-inch gravity sewer along the Ray Road alignment north of the Powerline Floodway.
- An existing 15-inch sewer within Eastmark Parkway, from Ray Road to Point Twenty-Two Boulevard, to serve DU 7.
- An existing 12-inch sewer within Point Twenty-Two , from Eastmark Parkway to west of Signal Butte Road, to serve DU 7.
- Existing 8-inch sewer lines within DU 7. Portions of DU 7 are still under construction.

3.0 WASTEWATER SYSTEM DESIGN

3.1 Design Criteria

Wastewater design flows and pipe-sizing criteria utilized in this Master Wastewater Report are based on Wood/Patel's understanding of the following:

- Applicable wastewater system design criteria listed in the *2012 City of Mesa Engineering Design Standards,* along with City accepted population based criteria per Table 10 – *DU 3/4 Wastewater Design Criteria* and Table 12 – *DU 5 East Wastewater Design Criteria*.
- Regionally-accepted design standards.
- Title 18, Chapter 9 of the *Arizona Administrative Code.*

Tables 1, 3, 5, 7, 9, and 11 present the Unit Daily Wastewater Flow for each land use category based on density and population specific to each master planned development unit as they have been approved. The design criterion is used in Tables 2, 4, 6, 8, 10, and 12 to determine the Daily Wastewater Flow for each development unit based on the detailed land use in master planned DU's and conceptual land use throughout the rest of Eastmark. The Development Unit Daily Wastewater Flow criteria are used to estimate the wastewater design flows and determine pipe sizes. This was performed by applying this design flow to each sub-basin.

3.2 Wastewater Design Flows

Wastewater design flows are estimated using the design criteria listed above and the *City of Mesa 2025 General Plan*. Projected full build-out average-day wastewater flows are summarized as follows in millions of gallons per day (MGD):

	Offsite Upstream Ray Basin	Offsite Upstream Williams Field Basin	Eastmark	**Total**
Elliot Road Outfall:	0 MGD	0 MGD	3.96 MGD	**3.96 MGD**
Warner Road Outfall:	0 MGD	0 MGD	2.85 MGD	**2.85 MGD**
Ray Road Outfall:	1.12 MGD	0.97 MGD	3.64 MGD	**5.73 MGD**
Total:	**1.12 MGD**	**0.97 MGD**	**10.45 MGD**	**12.54 MGD**

Sewer pipe capacities are based upon conveying the flow at two-thirds of the pipe capacity with exception to an existing 21-inch line near the Ray and Ellsworth Roads intersection which conveys flows at 84% of the pipe's capacity, and an existing 30-inch line along the west side of the former First Solar building which conveys flows at full build-out at 96% of the pipe's capacity which were sized and designed by others. It is Wood/Patel's understanding that wet-weather infiltration is accounted for within the City of Mesa peaking factors listed in the 2012 City of Mesa Engineering Design Standards.

An additional scenario was analyzed in this report to evaluate pipe sizes during a peak wet-weather wastewater flow, while a 450-000-gallon pool is drained at a rate to empty within 8 hours (938 gpm) downstream of the proposed Aquatic Center within DU 3/4. Results of the peak wet-weather flow analysis are shown on Table 14 – *Wastewater Model, Full Build-Out Condition*. Results show that during the peak wet-weather event, the limiting section of downstream sewer is the 15-inch line from Node R5 to Node R3, located immediately downstream of the Aquatic Center. During the peak wet-weather flows, this pipe section is flowing at 49.4 percent of the full-flow capacity with a d/D = 0.49. When the pool flow of 938 gpm is added to the peak wet-weather flow, the total sewer flow equals 1,891 gpm, which is 92-percent of the maximum capacity of the 15-inch sewer, and has a d/D equal to 0.80. Refer to Table 15 – *Calculated Pipe Capacities, Full Build-Out Condition* for the results, and Plate 2 – *Master Sewer Exhibit, Full Build-Out Condition* for pipe locations.

Additional detailed design flow calculations are provided in Table 14 and Table 15. Wood/Patel utilized criteria within the 2012 City of Mesa Design Standards based on static peaking methodology to calculate peak wet-weather flows for Eastmark. Static methodology is required by the City on an individual project basis to size onsite sewer lines. It is our understanding the City utilized a diurnal peaking methodology to evaluate the overall tributary area, including Eastmark, to aid in the design of the existing Ray Road and Elliot Road sewer lines. Diurnal peaking methodology is based on observed and/or estimated daily wastewater flow cycles for comparable developed areas, and is generally less conservative than static modeling resulting in lower peak flows. As a result, the peak wet-weather flows calculated in this Report for Eastmark may vary from those used in designing the Ray Road and Elliot Road sewer lines. The controlling section of the Ray Road sewer is an offsite 30-inch pipe at 0.14 percent slope. The

capacity of this pipe flowing full is approximately 11.94 MGD, and at d/D = 0.9 is 12.7 MGD. The controlling section of the Elliot Road sewer is an offsite 24-inch pipe at 0.39 percent slope. The capacity of this pipe flowing full is 9.15 MGD, and at d/D = 0.95 is 9.84 MGD. It is Wood/Patel's understanding that the City of Mesa will evaluate their wastewater collection system downstream of Eastmark utilizing diurnal peaking factors to evaluate if the system has capacity to convey flows estimated within this Report. If these evaluations indicate the capacity is exceeded in these lines, DMB would participate in projects necessary to provide additional capacity in these lines.

3.3 Sustainability Techniques

Eastmark is planned to develop as a sustainable community. In the future, new techniques and technologies will advance in sustainable water management that may be incorporated into the Site and could affect the wastewater system design.

4.0 PROPOSED SYSTEM

4.1 Planned Wastewater Infrastructure

The City of Mesa's Wastewater Master Plan has four sewer drainage basins within the study area of the Site, which include the Elliot, Warner, Ray, and Williams Field Sewer Drainage Basins. The Elliot Basin consists of DU 6 North and DU 5 East, which is approximately 355 acres located in the northeast corner of Eastmark, along with areas north of the Site from Signal Butte Road to the EMI at the corner of Elliot and Ellsworth Roads. The Warner Basin consists of a portion of the Site and property west of the Site to the EMI. The Ray Basin consists of a portion of the Site and property to the east and west. The Williams Field Basin includes property to the south and east of the Site.

Based on the City of Mesa's Wastewater Master Plan, three sewer lines west of Ellsworth Road, along Elliot Road, Warner Road, and Ray Road, are planned to serve the four sewer drainage basins.

4.1.1 Elliot Sewer Drainage Basin

Within the Elliot Sewer Drainage Basin, onsite flows from DU 6N and DU 5E are conveyed by gravity north to the existing Elliot Road Sewer. The Elliot Road Sewer was initially constructed to serve the First Solar industrial site within DU 6N. The Elliot Sewer conveys flow west to the EMI at the intersection of Elliot and Ellsworth Roads.

4.1.2 Warner Sewer Drainage Basin

Within the Warner Sewer Drainage Basin, onsite flows are conveyed by gravity sewer to the intersection of Ellsworth Road and Warner Road. A diversion manhole will be constructed to direct all of the flow south to Ellsworth Road and Ray Road in the initial condition until the offsite Warner Road Sewer is constructed. From this point, the Warner Basin flow will combine with the Ray and Williams Field Basin flow and will be conveyed through the offsite Ray Road sewer line to the EMI. Due to the uncertainty of timing for construction of the offsite Warner Road Sewer, this Report identifies the size of the sewer along Ellsworth Road required to convey the initial phase flow from the Warner Sewer Basin area during the interim condition until the Warner Road sewer is

constructed. In the full build-out condition, the diversion manhole may be adjusted to direct a portion of, or all of, the flow from the onsite Warner Basin to the offsite Warner Road sewer line. The diversion manhole will provide the City operational flexibility to direct flow to the Warner Road and Ray Road sewer lines, as necessary.

4.1.3 Ray Sewer Drainage Basin

The development east of Mountain Road discharges into an existing sewer line along Mountain Road. An existing diversion structure at Mountain Road and Ray Road allows the City to send the flow to either the Ray Road or Pecos Road Sewers. All flow north of Ray Road is currently diverted to the Ray Road Sewer, while flow from the development south of Ray Road is conveyed south to Pecos Road. It is the City's intent to continue this mode of operation to provide additional capacity in the Pecos Road Sewer for future development along Pecos Road.

The Nova Vista and Bella Via (formerly Mountain Horizons) developments east of the Site, between Signal Butte and Mountain Roads, discharge into existing sewer lines that convey flow to Signal Butte and Ray Roads. This flow is planned to combine with the flow east of Mountain Road and be conveyed across the Site in the existing Ray Road sewer line, between Signal Butte Road and Ellsworth Roads. This upstream flow is accounted for per the *Master Wastewater Report for Ray Road Sewer between Ellsworth and Mountain Roads*, prepared by CMX, L.L.C., dated November 18, 2005. From this point, the Ray Basin flow will combine with the initial Warner and Williams Field Basin flows and be conveyed through the offsite Ray Road sewer line to the EMI.

Portions of the original Ray Road sewer have been abandoned in place and replaced with a new sewer within Ray Road, with capacity to convey the projected build-out flows from both Eastmark and offsite.

4.1.4 Williams Field Sewer Drainage Basin

Wastewater from the areas within the Williams Field Basin will be conveyed west along Williams Field Road to the proposed SR 24, then north along

Crismon Road, and northwest through the proposed Pacific Proving Grounds development to Ellsworth Road. From this point, the Williams Field Basin flow will combine with the initial Warner and Ray Basin flows and be conveyed through the offsite Ray Road sewer line to the EMI. A second sewer will convey wastewater along Williams Field Road, west of the SR 24 ROW to Ellsworth Road, then north along Ellsworth to the SR 24 ROW. From there, it will flow northwest along the SR 24 ROW and discharge to the Ray Road Sewer, west of Ellsworth Road.

4.2 Pipe Sizing

Proposed sewer lines for the Site were sized to accommodate peak wet-weather flow conditions for the full build-out condition. The onsite collection system includes planned sewer mains with diameters ranging from 8 inches to 27 inches. Refer to Tables 14 and 15 for the Wastewater Model and Calculated Pipe Capacities, and Plate 2 for the planned full build-out wastewater collection system configurations.

5.0 CONCLUSIONS

The Master Wastewater Report Update for Eastmark presented herein meets City of Mesa standards and requirements, and serves as a guide for construction documents associated with the planned wastewater system. The following items highlight critical conclusions:

1. Eastmark is anticipated to be a 3,154-acre master planned community annexed into the City of Mesa.

2. The wastewater system presented is based on the projected full build-out condition of the Site.

3. A more detailed analysis of the wastewater system for each development unit will be provided with each Development Unit Master Wastewater Report. Each Development Unit Master Wastewater Report will address changes in the development units and adjacent development units which may occur as development progresses and densities change, and each report will present the portions of the improvements that must be built to serve the development unit. The individual Development Unit Master Reports will establish the phasing of the wastewater infrastructure as approved by the City.

4. Wastewater design criteria are based on Wood/Patel's understanding of the *2012 City of Mesa Engineering & Design Standards*, City accepted population based criteria, regionally accepted design standards, and Title 18, Chapter 9 of the *Arizona Administrative Code*.

5. The approximate average daily flow generated at build-out by the Site is 10.45 MGD per Section 3.2 of this Report.

6. Proposed onsite sewer mains are sized to accommodate peak wet-weather design flow for the full build-out condition.

7. The planned public wastewater collection systems outfall into existing and future gravity sewer lines located along the Elliot Road, Warner Road, and Ray Road alignments.

8. Wood/Patel's model of the proposed wastewater system provides conveyance and capacity in conformance with the City of Mesa's standards and Title 18 of the *Arizona Administrative Code*.

9. The City has evaluated the EMI and GWRP capacities, including planned capital improvements for adequacy in serving Eastmark as well as full build-out service areas based on flows defined in this Report. Development within the Warner Road Sewer Basin will be initially served by the Ray Road sewer until the total Qavg to the Ray Road sewer at Ellsworth Road and Ray Road reaches 2.8 MGD. Unless the Warner Road sewer line is already constructed downstream of Eastmark, once the Ray Road sewer reaches a predetermined flow a total Qavg of 2.8 MGD, Eastmark shall be responsible for coordinating with the City and other property owners contributing to the Warner Sewer Basin downstream of Eastmark to the design and construction of the Warner Road sewer from Ellsworth Road to the EMI. Eastmark will be responsible for a pro-rata share (based on flow capacity) of the cost to design and construct the Warner Road sewer line from Ellsworth Road to the EMI. If the Development Unit Master Reports alter these flows, the *Master Wastewater Report for Eastmark* may be required to be updated to reflect these changes as stated in Section 1.2.

10. The City of Mesa will evaluate their wastewater collection system downstream of Eastmark utilizing diurnal peaking factors to evaluate if the system has capacity to convey flows estimated within this Report. If these evaluations indicate capacity is exceeded in these lines, DMB would participate in projects necessary to provide additional capacity in these lines.

TABLE 1 – DU 6 North Modeled Land Use

TABLE 2 – DU 6 North Wastewater Design Criteria

WOOD/PATEL **TABLE 1 - DU 6 NORTH MODELED LAND USE (APPROVED REPORT DATED 04/22/2011)**

Project: DU 6 at Eastmark
Location: Mesa, Arizona

Proj. Number: 103564.04
Proj. Engineer: Michael Young, P.E.

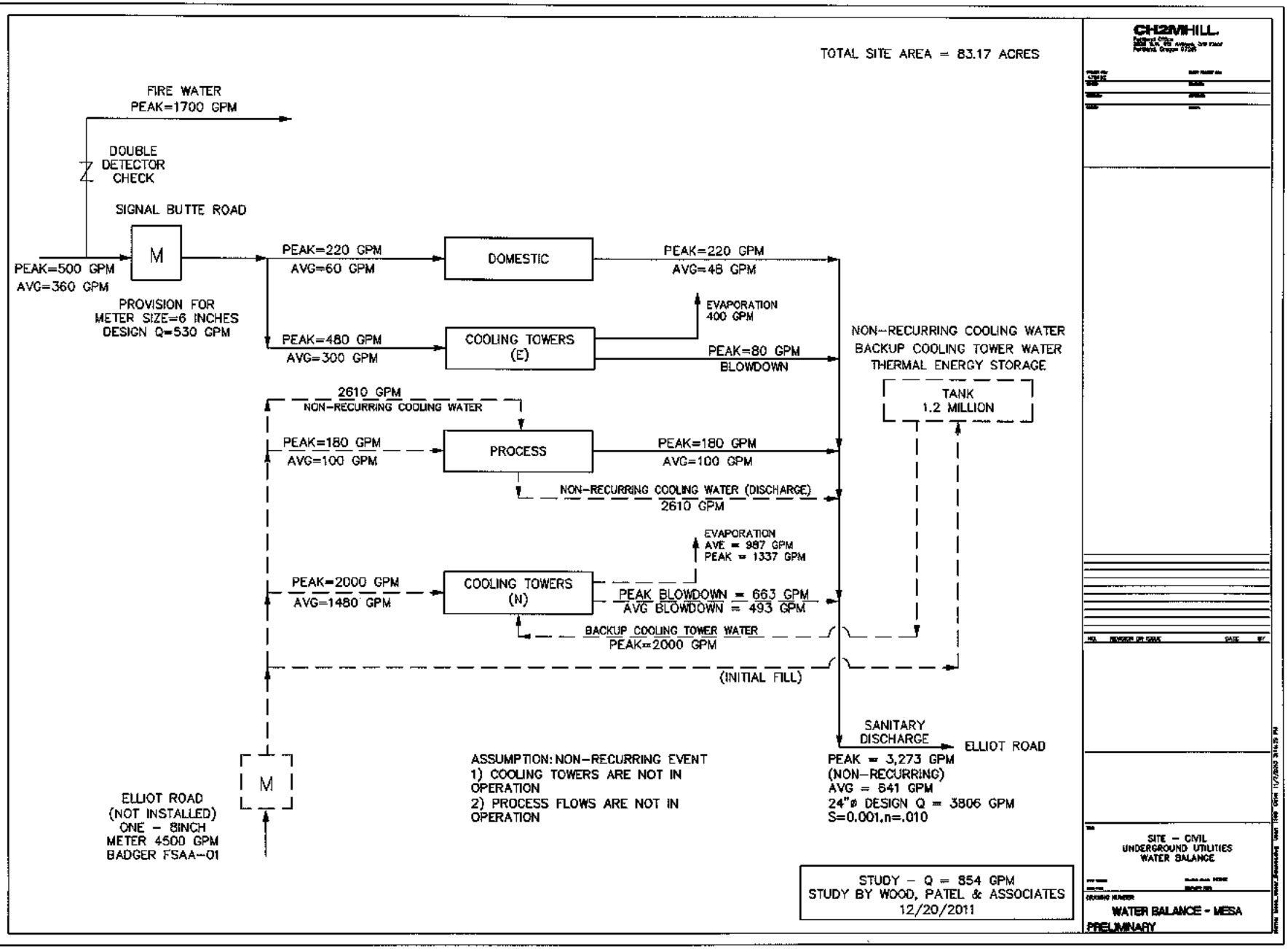
PRELIMINARY LAND USE AND DWELLING UNIT BREAKDOWN BY PARCEL

Parcel	No. of DUs	Residential Acres	Density (DU/AC)	Non-Residential Acres	Commercial/ Industrial/ Retail S.F.	Land Use	Unit Daily Wastewater Flow (GPD/AC)[2]	Avg Day[1]
DU-6A	--	--	--	89.1	1,340,000	INDUSTRIAL	10,360	923,040
DU-6B	--	--	--	53.7	1,340,000	INDUSTRIAL	13,869	744,771
DU-6C	--	--	--	129.7	2,680,000	INDUSTRIAL	11,485	1,489,541
DU 6 Totals	**0**	**0.0**		**272.5**	**5,360,000**			**3,157,352**

Notes:

1) Wastewater flows have been adjusted to account for the retrofit of the original First Solar Building within DU-6A. The average day wastewater flow of 641 GPM (923,040 GPD) for the retrofit was determined from the CH2M Hill Plan that was provided by the City of Mesa. The wastewater flows for DU-6B and DU-6C were assumed to be the same as the previously planned First Solar buildings. The water demand and wastewater flow diagram provided to Wood/Patel is included on the following page

2) The unit daily wastewater flow is calculated by taking the average day flow divided by the non-residential acres. The result is a unit daily wastewater flow in gallons per day per acre.


TOTAL SITE AREA = 83.17 ACRES
FIRE WATER
PEAK=1700 GPM
DOUBLE
DETECTOR
CHECK
SIGNAL BUTTE ROAD
M
PEAK=500 GPM
AVG=360 GPM
PROVISION FOR
METER SIZE=6 INCHES
DESIGN Q=530 GPM
PEAK=220 GPM
AVG=60 GPM
DOMESTIC
PEAK=220 GPM
AVG=48 GPM
EVAPORATION
400 GPM
PEAK=480 GPM
AVG=300 GPM
COOLING TOWERS
(E)
PEAK=80 GPM
BLOWDOWN
NON-RECURRING COOLING WATER
BACKUP COOLING TOWER WATER
THERMAL ENERGY STORAGE
TANK
1.2 MILLION
2610 GPM
NON-RECURRING COOLING WATER
PEAK=180 GPM
AVG=100 GPM
PROCESS
PEAK=180 GPM
AVG=100 GPM
NON-RECURRING COOLING WATER (DISCHARGE)
2610 GPM
EVAPORATION
AVE = 987 GPM
PEAK = 1337 GPM
PEAK=2000 GPM
AVG=1480 GPM
COOLING TOWERS
(N)
PEAK BLOWDOWN = 663 GPM
AVG BLOWDOWN = 493 GPM
BACKUP COOLING TOWER WATER
PEAK=2000 GPM
(INITIAL FILL)
SANITARY
DISCHARGE
ELLIOT ROAD
PEAK = 3,273 GPM
(NON-RECURRING)
AVG = 841 GPM
24"ø DESIGN Q = 3806 GPM
S=0.001,n=.010
M
ELLIOT ROAD
(NOT INSTALLED)
ONE - 8INCH
METER 4500 GPM
BADGER FSAA-01
ASSUMPTION: NON-RECURRING EVENT
1) COOLING TOWERS ARE NOT IN OPERATION
2) PROCESS FLOWS ARE NOT IN OPERATION
STUDY - Q = 854 GPM
STUDY BY WOOD, PATEL & ASSOCIATES
12/20/2011
CH2MHILL
SITE - CIVIL
UNDERGROUND UTILITIES
WATER BALANCE
WATER BALANCE - MESA
PRELIMINARY

Project: Mesa Proving Grounds
Location: Mesa, Arizona
Date: April 21, 2011

Proj. Number: 103564.04
Proj. Engineer: Michael Young, P.E.

References: 2007 City of Mesa Engineering Design Standards

UNIT DAILY RESIDENTIAL WASTEWATER FLOWS

		DENSITY		POPULATION DENSITY			FLOWS		WASTEWATER		
LAND USE CATEGORY	LAND USE	VALUE	UNITS	VALUE	UNITS	PERSONS PER ACRE	Value	Units	Value	Units	NOTES
LDR-1	Low Density Residential (LDR 0-1)	0.5	DU / Acre	2.5	Persons/ DU	1.25	80	GPD/ Person	100	GPD/AC	Source: Dwelling unit density divisions are based on City of Mesa 2025 General Plan. Unit wastewater flows are based on the City of Mesa 2007 Engineering and Design Standards.
LDR-2	LDR 0-1 & LDR 1-2 AVG.	1	DU / Acre	2.5	Persons/ DU	2.50	80	GPD/ Person	200	GPD/AC	
LDR-3	Low Density Residential (LDR-1-2)	1.2	DU / Acre	3.0	Persons/ DU	3.60	80	GPD/ Person	288	GPD/AC	
MDR-1	Medium Density Residential (MDR 2-4)	3.0	DU / Acre	3.0	Persons/ DU	9.00	80	GPD/ Person	720	GPD/AC	
MDR-2	MDR 2-4 & MDR 4-6 AVG.	4	DU / Acre	3.1	Persons/ DU	12.50	80	GPD/ Person	1,000	GPD/AC	
MDR-3	Medium Density Residential (MDR 4-6)	5.0	DU / Acre	3.2	Persons/ DU	16.00	80	GPD/ Person	1,280	GPD/AC	
MDR-4	Medium Density Residential (MDR 6-10)	6.5	DU / Acre	2.7	Persons/ DU	17.55	80	GPD/ Person	1,404	GPD/AC	
HDR-1	High Density Residential (HDR 10-15)	11.0	DU / Acre	2.0	Persons/ DU	22.00	80	GPD/ Person	1,760	GPD/AC	
HDR-2	High Density Residential (HDR 15+)	17.0	DU / Acre	1.7	Persons/ DU	28.90	80	GPD/ Person	2,312	GPD/AC	
MUR-1	Mixed Use/Residential (MUR) Residential	15.0	DU / Acre	1.7	Persons/ DU	25.50	80	GPD/ Person	2,040	GPD/AC	

UNIT DAILY NON-RESIDENTIAL WASTEWATER FLOWS

	DWELLING UNIT DENSITY		POPULATION DENSITY			FLOWS		WASTEWATER		
LAND USE	VALUE	UNITS	VALUE	UNITS	PERSONS PER ACRE	Value	Units	Value	Units	NOTES
Hotel	--	--	--	--	--	--	--	150	GPD/ ROOM	Source: City of Mesa 2007 Engineering and Design Standards.
Commercial/Retail Office	--	--	23.0	Employees/ Acre	23.00	54	GPD/ Employee	1,242	GPD/ AC	
Education/Civic/ Church	--	--	15.0	Employees/ Acre	15.00	54	GPD/ Employee	810	GPD/ AC	

OFFSITE

	DWELLING UNIT DENSITY		POPULATION DENSITY		PERSONS	WASTEWATER DESIGN		UNIT DAILY		
LAND USE	VALUE	UNITS	VALUE	UNITS	PER ACRE	Value	Units	Value	Units	NOTES
CC	--	--	14.0	Employees/ Acre	14.00	54	GPD/ Employee	756	GPD/ AC	Source: City of Mesa 2007 Engineering and Design Standards and the City of Mesa 2025 General Plan
O	--	--	23.0	Employees/ Acre	23.00	54	GPD/ Employee	1,242	GPD/ AC	
RC	--	--	14.0	Employees/ Acre	14.00	54	GPD/ Employee	756	GPD/ AC	
BPI	--	--	8.0	Employees/ Acre	8.00	54	GPD/ Employee	432	GPD/ AC	
NC	--	--	11.0	Employees/ Acre	11.00	54	GPD/ Employee	594	GPD/ AC	
LI	--	--	7.0	Employees/ Acre	7.00	54	GPD/ Employee	378	GPD/ AC	
MUE	--	--	15.0	Employees/ Acre	15.00	54	GPD/ Employee	810	GPD/ AC	
GI	--	--	15.0	Employees/ Acre	15.00	54	GPD/ Employee	810	GPD/ AC	
OFFUPSTREAM	1,040,576 GPD / 1470 Acres = 708 GPD/AC							708	GPD/ AC	Source: *Master Wastewater Report for Ray Road Sewer Between Ellsworth and Mountain Roads*, by CMX, 11/18/2005.

Description	Value	Units	Note(s)
General			
Minimum Velocity (d/D=2/3)	2	ft/sec	1
Maximum Flow Velocity (d/D=2/3)	9	ft/sec	1
Maximum Peak Flow Depth-to-Diameter Ratio (d/D)	0.67	-	
Minimum Pipe Diameter	8	in	1
Manning's "n" value	0.013	-	2
Peaking Factor (ADF< 1.0 MGD)	3		1
Peaking Factor (1.0 < ADF< 10.0 MGD)	2.5		1
Peaking Factor (10.0 < ADF< 20.0 MGD)	2.3		1

Notes:

1. Per The City of Mesa 2007 Engineering & Design Standards

2. Title 18, Chapter 9 of the Arizona Administrative Code

TABLE 3 – DU 7 Modeled Land Use

TABLE 4 – DU 7 Wastewater Design Criteria

TABLE 3 - DU 7 MODELED LAND USE (REAPPROVED REPORT DATED 05/17/2013)

Project: DU 7 at Eastmark
Location: Mesa, Arizona

Proj. Number: 113697.07
Proj. Engineer: Darrell Smith, P.E.

PRELIMINARY LAND USE AND DWELLING UNIT BREAKDOWN

Parcel	No. of DUs	Residential Acres	Density (DU/AC)	Non-Residential Acres	Commercial/ Industrial/ Retail S.F.	Land Use	Population Density (persons/ DU or Acre)	Total Population	GPDC	Avg Day	Total Avg Day
7-1	84	15.9	5.28	--	--	MDR-3	3.2	268.8	80	21,504	21,504
7-2	79	19.3	4.09	--	--	MDR-1	3.0	237.0	80	18,960	18,960
7-3	110	30.7	3.58	--	--	MDR-1	3.0	330.0	80	26,400	26,400
7-4	84	32.3	2.60	--	--	MDR-1	3.0	252.0	80	20,160	20,160
7-5	66	25.1	2.63	--	--	MDR-1	3.0	198.0	80	15,840	15,840
7-6	38	18.5	2.05	--	--	MDR-1	3.0	114.0	80	9,120	9,120
7-7	98	26.8	3.66	--	--	MDR-1	3.0	294.0	80	23,520	23,520
7-8	120	23.5	5.11	--	--	MDR-3	3.2	384.0	80	30,720	30,720
7-9	81	23.1	3.51	--	--	MDR-1	3.0	243.0	80	19,440	19,440
7-10	--	--	--	7.5	37,000	CHURCH	15.0	112.5	54	6,075	6,075
7-11	135	24.4	5.53	--	--	MDR-3	3.2	432.0	80	34,560	34,560
7-12	97	23.0	4.22	--	--	MDR-1	3.0	291.0	80	23,280	23,280
7-13	78	19.2	4.06	--	--	MDR-1	3.0	234.0	80	18,720	18,720
7-14	53	17.3	3.06	--	--	MDR-1	3.0	159.0	80	12,720	12,720
7-15	58	18.4	3.15	--	--	MDR-1	3.0	174.0	80	13,920	13,920
7-16	106	26.4	4.02	--	--	MDR-1	3.0	318.0	80	25,440	25,440
7-17	99	20.1	4.93	--	--	MDR-3	3.2	316.8	80	25,344	25,344
7-18	85	29.1	2.92	--	--	MDR-1	3.0	255.0	80	20,400	20,400
7-19	103	23.8	4.33	--	--	MDR-1	3.0	309.0	80	24,720	24,720
7-20	80	19.9	4.02	--	--	MDR-1	3.0	240.0	80	19,200	19,200
7-21	84	19.0	4.42	--	--	MDR-1	3.0	252.0	80	20,160	20,160
7-22	--	--	--	20.0	185,000	EDUCATION	15.0	300.0	54	16,200	16,200
7-23	220	20.0	11.00	--		HDR-1	2.0	440.0	80	35,200	35,200
7-24	--	--	--	6.0	20,000	CHURCH	15.0	90.0	54	4,860	4,860
7-25	--	--	--	2.5	8,000	CIVIC	15.0	37.5	54	2,025	2,025
7-26	--	--	--	5.5	15,000	COMMERCIAL/ RESTAURANT	23.0	126.5	54	6,831	6,831
7-27	--	--	--	29.3	--	PARK/LAKE	--	0.0	--	--	--
ROW	--	--	--	28.9	--	INFRASTRUCTURE ROAD R.O.W.	--	--	--	--	--
DU 7 Totals	**1958**	**475.8**		**99.7**	**265,000**			**6408.1**		**495,319**	**495,319**

Project: Eastmark
Location: Mesa, Arizona
References: 2009 City of Mesa Engineering Design Standards

Proj. Number: 113697.07
Proj. Engineer: Darrell Smith, P.E.

UNIT DAILY RESIDENTIAL WASTEWATER FLOWS

LAND USE CATEGORY	LAND USE	DWELLING UNIT DENSITY VALUE	DWELLING UNIT DENSITY UNITS	POPULATION DENSITY VALUE	POPULATION DENSITY UNITS	PERSONS PER ACRE	WASTEWATER DESIGN FLOWS (PER CAPITA) Value	WASTEWATER DESIGN FLOWS (PER CAPITA) Units	UNIT DAILY WASTEWATER FLOWS Value	UNIT DAILY WASTEWATER FLOWS Units	NOTES
LDR-1	Low Density Residential (LDR 0-1)	0.5	DU / Acre	2.5	Persons/ DU	1.25	80	GPD/ Person	100	GPD/AC	Source: Dwelling unit density divisions are based on City of Mesa 2025 General Plan. Unit wastewater flows are based on the City of Mesa 2007 Engineering and Design Standards.
LDR-2	LDR 0-1 & LDR 1-2 AVG.	1	DU / Acre	2.5	Persons/ DU	2.50	80	GPD/ Person	200	GPD/AC	
LDR-3	Low Density Residential (LDR-1-2)	1.2	DU / Acre	3.0	Persons/ DU	3.60	80	GPD/ Person	288	GPD/AC	
MDR-1	Medium Density Residential (MDR 2-4)	3.0	DU / Acre	3.0	Persons/ DU	9.00	80	GPD/ Person	720	GPD/AC	
MDR-2	MDR 2-4 & MDR 4-6 AVG.	4	DU / Acre	3.1	Persons/ DU	12.50	80	GPD/ Person	1,000	GPD/AC	
MDR-3	Medium Density Residential (MDR 4-6)	5.0	DU / Acre	3.2	Persons/ DU	16.00	80	GPD/ Person	1,280	GPD/AC	
MDR-4	Medium Density Residential (MDR 6-10)	6.5	DU / Acre	2.7	Persons/ DU	17.55	80	GPD/ Person	1,404	GPD/AC	
HDR-1	High Density Residential (HDR 10-15)	11.0	DU / Acre	2.0	Persons/ DU	22.00	80	GPD/ Person	1,760	GPD/AC	
HDR-2	High Density Residential (HDR 15+)	17.0	DU / Acre	1.7	Persons/ DU	28.90	80	GPD/ Person	2,312	GPD/AC	
MUR-1	Mixed Use/Residential (MUR) Residential	15.0	DU / Acre	1.7	Persons/ DU	25.50	80	GPD/ Person	2,040	GPD/AC	

UNIT DAILY NON-RESIDENTIAL WASTEWATER FLOWS

LAND USE	DWELLING UNIT DENSITY VALUE	DWELLING UNIT DENSITY UNITS	POPULATION DENSITY VALUE	POPULATION DENSITY UNITS	PERSONS PER ACRE	WASTEWATER DESIGN FLOWS (PER CAPITA) Value	WASTEWATER DESIGN FLOWS (PER CAPITA) Units	UNIT DAILY WASTEWATER FLOWS Value	UNIT DAILY WASTEWATER FLOWS Units	NOTES
Hotel	--	--	--	--	--	--	--	150	GPD/ ROOM	Source: City of Mesa 2007 Engineering and Design Standards.
Commercial/Retail Office	--	--	23.0	Employees/ Acre	23.00	54	GPD/ Employee	1,242	GPD/ AC	
Education/Civic/ Church	--	--	15.0	Employees/ Acre	15.00	54	GPD/ Employee	810	GPD/ AC	

OFFSITE

LAND USE	DWELLING UNIT DENSITY VALUE	DWELLING UNIT DENSITY UNITS	POPULATION DENSITY VALUE	POPULATION DENSITY UNITS	PERSONS PER ACRE	WASTEWATER DESIGN Value	WASTEWATER DESIGN Units	UNIT DAILY Value	UNIT DAILY Units	NOTES
CC	--	--	14.0	Employees/ Acre	14.00	54	GPD/ Employee	756	GPD/ AC	Source: City of Mesa 2007 Engineering and Design Standards and the City of Mesa 2025 General Plan
O	--	--	23.0	Employees/ Acre	23.00	54	GPD/ Employee	1,242	GPD/ AC	
RC	--	--	14.0	Employees/ Acre	14.00	54	GPD/ Employee	756	GPD/ AC	
BPI	--	--	8.0	Employees/ Acre	8.00	54	GPD/ Employee	432	GPD/ AC	
NC	--	--	11.0	Employees/ Acre	11.00	54	GPD/ Employee	594	GPD/ AC	
LI	--	--	7.0	Employees/ Acre	7.00	54	GPD/ Employee	378	GPD/ AC	
MUE	--	--	15.0	Employees/ Acre	15.00	54	GPD/ Employee	810	GPD/ AC	
GI	--	--	15.0	Employees/ Acre	15.00	54	GPD/ Employee	810	GPD/ AC	
OFFUPSTREAM	1,040,576 GPD / 1470 Acres = 708 GPD/AC							708	GPD/ AC	Source: *Master Wastewater Report for Ray Road Sewer Between*

Description	Value	Units	Note(s)
General			
Minimum Velocity (d/D=2/3)	2	ft/sec	1
Maximum Flow Velocity (d/D=2/3)	9	ft/sec	1
Maximum Peak Flow Depth-to-Diameter Ratio (d/D)	0.67	-	
Minimum Pipe Diameter	8	in	1
Manning's "n" value	0.013	-	2
Peaking Factor (ADF< 1.0 MGD)	3		1
Peaking Factor (1.0 < ADF< 10.0 MGD)	2.5		1
Peaking Factor (10.0 < ADF< 20.0 MGD)	2.3		1

Notes:

1. *Per The City of Mesa 2009 Engineering & Design Standards*
2. Title 18, Chapter 9 of the Arizona Administrative Code

TABLE 5 – DU 8 & 9 Modeled Land Use

TABLE 6 – DU 8 & 9 Wastewater Design Criteria

WOOD/PATEL **TABLE 5 - DU 8 & 9 MODELED LAND USE (REAPPROVED REPORT DATED 01/15/2014)**

Project: DU 8 & 9 at Eastmark
Location: Mesa, Arizona

Proj. Number: 123835.04
Proj. Engineer: Darrell Smith, P.E.

PRELIMINARY LAND USE AND DWELLING UNIT BREAKDOWN

Parcel	No. of DUs	Residential Acres	Density (DU/AC)	Non-Residential Acres	Commercial/ Industrial/ Retail S.F.	Land Use	Population Density (persons/ DU or Acre)	Total Population	GPDC	Avg Day	Total Avg Day
8-1	74	22.9	3.23	--	--	MDR-1	3	222	80	17,760	17,760
8-2	87	30.0	2.90	--	--	MDR-1	3	261	80	20,880	20,880
8-3	64	24.7	2.59	--	--	MDR-1	3	192	80	15,360	15,360
8-4	42	20.9	2.01	--	--	MDR-1	3	126	80	10,080	10,080
8-5	--	--	--	6.8	--	PARK	--	--	--	--	0
8-6	91	23.6	3.86	--	--	MDR-1	3	273	80	21,840	21,840
8-7	74	28.2	2.62	--	--	MDR-1	3	222	80	17,760	17,760
8-8	39	20.0	1.95	--	--	LDR-3	3	117	80	9,360	9,360
8-9	64	21.7	2.95	--	--	MDR-1	3	192	80	15,360	15,360
9-1	189	54.0	3.50	--	--	MDR-1	2	378	80	30,240	30,240
9-2	99	31.8	3.11	--	--	MDR-1	2	198	80	15,840	15,840
9-3	--	--	--	12.4	200,000	Civic	15	186	54	10,044	10,044
9-4	159	49.4	3.22	--	--	MDR-1	2	318	80	25,440	25,440
9-5	145	39.8	3.64	--	--	MDR-1	2	290	80	23,200	23,200
9-6	90	22.4	4.02	--	--	MDR-2	2	180	80	14,400	14,400
9-7	226	60.7	3.72	--	--	MDR-1	2	452	80	36,160	36,160
Other	--	--	--	57.3		Drainage Channel/Road ROW	--	--	--	--	0
DU 8 & 9 Totals	**1443**	**450.1**		**76.5**	**200,000**			**3,607**		**283,724**	**283,724**

1) Parcels 9-1 through 9-7 are part of a proposed Active Adult community therefore the assumption of 2 persons per dwelling unit in lieu of 3 persons per dwelling unit for the population density would produce a more accurate estimation of peak flows.

Project: DU 8 & 9 at Eastmark
Location: Mesa, Arizona
References: 2009 City of Mesa Engineering Design Standards

Proj. Number: 123835.04
Proj. Engineer: Darrell Smith, P.E.

UNIT DAILY RESIDENTIAL WASTEWATER FLOWS

LAND USE CATEGORY	LAND USE	DWELLING UNIT DENSITY VALUE	DWELLING UNIT DENSITY UNITS	POPULATION DENSITY VALUE	POPULATION DENSITY UNITS	PERSONS PER ACRE	WASTEWATER DESIGN FLOWS (PER CAPITA) Value	WASTEWATER DESIGN FLOWS (PER CAPITA) Units	UNIT DAILY WASTEWATER FLOWS Value	UNIT DAILY WASTEWATER FLOWS Units	NOTES
LDR-1	Low Density Residential (LDR 0-1)	0.5	DU / Acre	2.5	Persons/ DU	1.25	80	GPD/ Person	100	GPD/AC	Source: Dwelling unit density divisions are based on City of Mesa 2025 General Plan. Unit wastewater flows are based on the City of Mesa 2009 Engineering and Design Standards.
LDR-2	LDR 0-1 & LDR 1-2 AVG.	1	DU / Acre	2.5	Persons/ DU	2.50	80	GPD/ Person	200	GPD/AC	
LDR-3	Low Density Residential (LDR-1-2)	1.2	DU / Acre	3.0	Persons/ DU	3.60	80	GPD/ Person	288	GPD/AC	
MDR-1	Medium Density Residential (MDR 2-4)	3.0	DU / Acre	3.0	Persons/ DU	9.00	80	GPD/ Person	720	GPD/AC	
MDR-2	MDR 2-4 & MDR 4-6 AVG.	4	DU / Acre	3.1	Persons/ DU	12.50	80	GPD/ Person	1,000	GPD/AC	
MDR-3	Medium Density Residential (MDR 4-6)	5.0	DU / Acre	3.2	Persons/ DU	16.00	80	GPD/ Person	1,280	GPD/AC	
MDR-4	Medium Density Residential (MDR 6-10)	6.5	DU / Acre	2.7	Persons/ DU	17.55	80	GPD/ Person	1,404	GPD/AC	
HDR-1	High Density Residential (HDR 10-15)	11.0	DU / Acre	2.0	Persons/ DU	22.00	80	GPD/ Person	1,760	GPD/AC	
HDR-2	High Density Residential (HDR 15+)	17.0	DU / Acre	1.7	Persons/ DU	28.90	80	GPD/ Person	2,312	GPD/AC	
MUR-1	Mixed Use/Residential (MUR) Residential	15.0	DU / Acre	1.7	Persons/ DU	25.50	80	GPD/ Person	2,040	GPD/AC	

UNIT DAILY NON-RESIDENTIAL WASTEWATER FLOWS

LAND USE	DWELLING UNIT DENSITY VALUE	DWELLING UNIT DENSITY UNITS	POPULATION DENSITY VALUE	POPULATION DENSITY UNITS	PERSONS PER ACRE	WASTEWATER DESIGN FLOWS (PER CAPITA) Value	WASTEWATER DESIGN FLOWS (PER CAPITA) Units	UNIT DAILY WASTEWATER FLOWS Value	UNIT DAILY WASTEWATER FLOWS Units	NOTES
Hotel	--	--	--	--	--	--	--	150	GPD/ ROOM	Source: City of Mesa 2009 Engineering and Design Standards.
Commercial/Retail Office	--	--	23.0	Employees/ Acre	23.00	54	GPD/ Employee	1,242	GPD/ AC	
Education/Civic/ Church	--	--	15.0	Employees/ Acre	15.00	54	GPD/ Employee	810	GPD/ AC	

OFFSITE

LAND USE	DWELLING UNIT DENSITY VALUE	DWELLING UNIT DENSITY UNITS	POPULATION DENSITY VALUE	POPULATION DENSITY UNITS	PERSONS PER ACRE	WASTEWATER DESIGN Value	WASTEWATER DESIGN Units	UNIT DAILY Value	UNIT DAILY Units	NOTES
CC	--	--	14.0	Employees/ Acre	14.00	54	GPD/ Employee	756	GPD/ AC	Source: City of Mesa 2009 Engineering and Design Standards and the City of Mesa 2025 General Plan
O	--	--	23.0	Employees/ Acre	23.00	54	GPD/ Employee	1,242	GPD/ AC	
RC	--	--	14.0	Employees/ Acre	14.00	54	GPD/ Employee	756	GPD/ AC	
BPI	--	--	8.0	Employees/ Acre	8.00	54	GPD/ Employee	432	GPD/ AC	
NC	--	--	11.0	Employees/ Acre	11.00	54	GPD/ Employee	594	GPD/ AC	
LI	--	--	7.0	Employees/ Acre	7.00	54	GPD/ Employee	378	GPD/ AC	
MUE	--	--	15.0	Employees/ Acre	15.00	54	GPD/ Employee	810	GPD/ AC	
GI	--	--	15.0	Employees/ Acre	15.00	54	GPD/ Employee	810	GPD/ AC	
OFFUPSTREAM	1,040,576 GPD / 1470 Acres = 708 GPD/AC							708	GPD/ AC	Source: *Master Wastewater Report for Ray Road Sewer Between*

Description	Value	Units	Note(s)
General			
Minimum Velocity (d/D=2/3)	2	ft/sec	1
Maximum Flow Velocity (d/D=2/3)	9	ft/sec	1
Maximum Peak Flow Depth-to-Diameter Ratio (d/D)	0.67	-	
Minimum Pipe Diameter	8	in	1
Manning's "n" value	0.013	-	2
Peaking Factor (ADF< 1.0 MGD)	3		1
Peaking Factor (1.0 < ADF< 10.0 MGD)	2.5		1
Peaking Factor (10.0 < ADF< 20.0 MGD)	2.3		1

Notes:
1. Per The City of Mesa 2009 Engineering & Design Standards
2. Title 18, Chapter 9 of the Arizona Administrative Code

TABLE 7 – DU 3 South Modeled Land Use

TABLE 8 – DU 3 South Wastewater Design Criteria

WOOD/PATEL **TABLE 7 - DU 3 SOUTH MODELED LAND USE (APPROVED REPORT DATED 12/17/2013)**

Project: DU 3S at Eastmark
Location: Mesa, Arizona

Proj. Number: 113697.08
Proj. Engineer: Darrell Smith, P.E.

PRELIMINARY LAND USE AND DWELLING UNIT BREAKDOWN

Parcel	No. of DUs	Residential Acres	Density (DU/AC)	Non-Residential Acres	Land Use	Population Density (persons/ DU or Acre)	Total Population	GPDC	Avg Day	Total Avg Day
3S-1	137	30.9	4.43	--	MDR-2	3.1	425	80	34,000	34,000
3S-2	115	31.4	3.66	--	MDR-2	3.1	357	80	28,560	28,560
3S-3	139	30.0	4.63	--	MDR-2	3.1	431	80	34,480	34,480
DU 3S Totals	**391**	**92.3**		**0.0**			**1,213**		**97,040**	**97,040**

Project: DU 3 South at Eastmark
Location: Mesa, Arizona
References: 2009 City of Mesa Engineering Design Standards

Proj. Number: 113697.08
Proj. Engineer: Darrell Smith, P.E.

UNIT DAILY RESIDENTIAL WASTEWATER FLOWS

LAND USE CATEGORY	LAND USE	DWELLING UNIT DENSITY VALUE	DWELLING UNIT DENSITY UNITS	POPULATION DENSITY VALUE	POPULATION DENSITY UNITS	PERSONS PER ACRE	WASTEWATER DESIGN FLOWS (PER CAPITA) Value	WASTEWATER DESIGN FLOWS (PER CAPITA) Units	UNIT DAILY WASTEWATER FLOWS Value	UNIT DAILY WASTEWATER FLOWS Units	NOTES
LDR-1	Low Density Residential (LDR 0-1)	0.5	DU / Acre	2.5	Persons/ DU	1.25	80	GPD/ Person	100	GPD/AC	Source: Dwelling unit density divisions are based on City of Mesa 2025 General Plan. Unit wastewater flows are based on the City of Mesa 2009 Engineering and Design Standards.
LDR-2	LDR 0-1 & LDR 1-2 AVG.	1	DU / Acre	2.5	Persons/ DU	2.50	80	GPD/ Person	200	GPD/AC	
LDR-3	Low Density Residential (LDR-1-2)	1.2	DU / Acre	3.0	Persons/ DU	3.60	80	GPD/ Person	288	GPD/AC	
MDR-1	Medium Density Residential (MDR 2-4)	3.0	DU / Acre	3.0	Persons/ DU	9.00	80	GPD/ Person	720	GPD/AC	
MDR-2	MDR 2-4 & MDR 4-6 AVG.	4	DU / Acre	3.1	Persons/ DU	12.50	80	GPD/ Person	1,000	GPD/AC	
MDR-3	Medium Density Residential (MDR 4-6)	5.0	DU / Acre	3.2	Persons/ DU	16.00	80	GPD/ Person	1,280	GPD/AC	
MDR-4	Medium Density Residential (MDR 6-10)	6.5	DU / Acre	2.7	Persons/ DU	17.55	80	GPD/ Person	1,404	GPD/AC	
HDR-1	High Density Residential (HDR 10-15)	11.0	DU / Acre	2.0	Persons/ DU	22.00	80	GPD/ Person	1,760	GPD/AC	
HDR-2	High Density Residential (HDR 15+)	17.0	DU / Acre	1.7	Persons/ DU	28.90	80	GPD/ Person	2,312	GPD/AC	
MUR-1	Mixed Use/Residential (MUR) Residential	15.0	DU / Acre	1.7	Persons/ DU	25.50	80	GPD/ Person	2,040	GPD/AC	

UNIT DAILY NON-RESIDENTIAL WASTEWATER FLOWS

LAND USE	DWELLING UNIT DENSITY VALUE	DWELLING UNIT DENSITY UNITS	POPULATION DENSITY VALUE	POPULATION DENSITY UNITS	PERSONS PER ACRE	WASTEWATER DESIGN FLOWS (PER CAPITA) Value	WASTEWATER DESIGN FLOWS (PER CAPITA) Units	UNIT DAILY WASTEWATER FLOWS Value	UNIT DAILY WASTEWATER FLOWS Units	NOTES
Hotel	--	--	--	--	--	--	--	150	GPD/ ROOM	Source: City of Mesa 2009 Engineering and Design Standards.
Commercial/Retail Office	--	--	23.0	Employees/ Acre	23.00	54	GPD/ Employee	1,242	GPD/ AC	
Education/Civic/ Church	--	--	15.0	Employees/ Acre	15.00	54	GPD/ Employee	810	GPD/ AC	

OFFSITE

LAND USE	DWELLING UNIT DENSITY VALUE	DWELLING UNIT DENSITY UNITS	POPULATION DENSITY VALUE	POPULATION DENSITY UNITS	PERSONS PER ACRE	WASTEWATER DESIGN Value	WASTEWATER DESIGN Units	UNIT DAILY Value	UNIT DAILY Units	NOTES
CC	--	--	14.0	Employees/ Acre	14.00	54	GPD/ Employee	756	GPD/ AC	Source: City of Mesa 2009 Engineering and Design Standards and the City of Mesa 2025 General Plan
O	--	--	23.0	Employees/ Acre	23.00	54	GPD/ Employee	1,242	GPD/ AC	
RC	--	--	14.0	Employees/ Acre	14.00	54	GPD/ Employee	756	GPD/ AC	
BPI	--	--	8.0	Employees/ Acre	8.00	54	GPD/ Employee	432	GPD/ AC	
NC	--	--	11.0	Employees/ Acre	11.00	54	GPD/ Employee	594	GPD/ AC	
LI	--	--	7.0	Employees/ Acre	7.00	54	GPD/ Employee	378	GPD/ AC	
MUE	--	--	15.0	Employees/ Acre	15.00	54	GPD/ Employee	810	GPD/ AC	
GI	--	--	15.0	Employees/ Acre	15.00	54	GPD/ Employee	810	GPD/ AC	
OFFUPSTREAM	1,040,576 GPD / 1470 Acres = 708 GPD/AC							708	GPD/ AC	Source: *Master Wastewater Report for Ray Road Sewer Between*

Description	Value	Units	Note(s)
General			
Minimum Velocity (d/D=2/3)	2	ft/sec	1
Maximum Flow Velocity (d/D=2/3)	9	ft/sec	1
Maximum Peak Flow Depth-to-Diameter Ratio (d/D)	0.67	-	
Minimum Pipe Diameter	8	in	1
Manning's "n" value	0.013	-	2
Peaking Factor (ADF< 1.0 MGD)	3		1
Peaking Factor (1.0 < ADF< 10.0 MGD)	2.5		1
Peaking Factor (10.0 < ADF< 20.0 MGD)	2.3		1

Notes:

1. Per The City of Mesa 2009 Engineering & Design Standards

2 Title 18, Chapter 9 of the Arizona Administrative Code

TABLE 9 – DU 3/4 Modeled Land Use

TABLE 10 – DU 3/4 Wastewater Design Criteria

TABLE 9 - DU 3/4 MODELED LAND USE

Project: DU 3/4 at Eastmark
Location: Mesa, Arizona

Proj. Number: 113697.09
Proj. Engineer: Dan Matthews, P.E.

PRELIMINARY LAND USE AND DWELLING UNIT BREAKDOWN

Parcel	No. of DUs	Residential Acres	Density (DU/Acre)	Non-Residential Acres	Land Use	Floor Area (SQ. FT.)	Population Density		Total Population	Wastewater Design Flows (Per Capita)		Avg Day Flow (GPD)	Total Avg Day Flow (GPD)
WARNER ROAD SEWER													
3/4-1	--	--	--	10.0	Middle School	87,120	100	Students and Staff / Acre	1,000	40	GPD / Person	40,000	40,000
3/4-2	460	23.0	20.0	--	HDR-2	--	1.7	Persons/ DU	782	80	GPD/ Person	62,560	62,560
Warner Road Totals	**460**	**23.0**		**10.0**					**1,782**			**102,560**	**102,560**
RAY ROAD SEWER													
3/4-3	--	--	--	58.9	Park	--	--	--	--	--	--	--	--
3/4-4	--	--	--	5.0	Elementary School	43,560	200	Students and Staff / Acre	1,000	40	GPD / Person	40,000	40,000
3/4-5	--	--	--	15.0	Library	50,000	0.4	Employees / 1,000 S.F.	20	54	GPD / Person	1,080	3,080
							2.0	Patrons / 1,000 S.F.	100	20	GPD / Person	2,000	
3/4-6	--	--	--	16.0	Aquatic Center	50,000	200	Patrons and Staff / Acre	3,200	10	GPD / Person	32,000	32,000
3/4-7	--	--	--	49.0	University	--	4,780	Boarded Students	4,780	80	GPD / Person	382,400	382,400
3/4-8	640	32.0	20.0	--	HDR-2	--	1.7	Persons/DU	1,088	80	GPD/ Person	87,040	87,040
3/4-9	--	--	--	112.0	University	--	7,970	Boarded Students	7,970	80	GPD / Person	637,600	835,600
							4,950	Commuter Students and Staff	4,950	40	GPD / Person	198,000	
3/4-10	3,459	173.0	20.0	--	HDR-2	--	1.7	Persons/ DU	5,880	80	GPD/ Person	470,400	470,400
3/4-11	--	--	--	29.5	Office	1,124,000	5.0	Employees / 1,000 S.F.	5,620	54	GPD / Person	303,480	303,480
3/4-12	--	--	--	12.5	Office	476,000	5.0	Employees / 1,000 S.F.	2,380	54	GPD / Person	128,520	128,520
3/4-13	--	--	--	45.0	Commercial / Retail / Restaurant	278,000	2.5	Employees and Patrons / 1,000 S.F.	695	54	GPD / Person	37,530	205,530
	--	--	--		Office	525,000	5.0	Employees / 1,000 S.F.	2,625	54	GPD / Person	141,750	
	--	--	--		Theater	12 Screens	250	Seats / Screen	3,000	5.0	GPD / Seat	15,000	
	--	--	--			50,000							
	--	--	--		Hotel	45,000	150	Rooms	--	75	GPD / Room	11,250	
Other	--	--	--	27.4	Road ROW	--		--	--	--	--	--	--
Ray Road Totals	**4099**	**205.0**		**370.3**		**2,728,680**			**43,308**			**2,488,050**	**2,488,050**
DU 3/4 Totals	**4559**	**228.0**		**380.3**					**45,090**			**2,590,610**	**2,590,610**

Project: DU 3/4 at Eastmark
Location: Mesa, Arizona
References: 2012 City of Mesa Engineering Design Standards and City of Mesa Approved Population Based Criteria

Proj. Number: 113697.09
Proj. Engineer: Dan Matthews, P.E.

UNIT DAILY RESIDENTIAL WASTEWATER FLOWS

LAND USE CATEGORY	LAND USE	DWELLING UNIT DENSITY		POPULATION DENSITY		WASTEWATER DESIGN FLOWS (PER CAPITA)		UNIT DAILY WASTEWATER FLOWS		NOTES
LDR-1	Low Density Residential (LDR 0-1)	0.5	DU / Acre	2.5	Persons/ DU	80	GPD/ Person	200	GPD/DU	Source: Dwelling unit density divisions are based on City of Mesa 2025 General Plan. Unit wastewater flows are based on the City of Mesa 2012 Engineering and Design Standards.
LDR-2	LDR 0-1 & LDR 1-2 AVG.	1	DU / Acre	2.5	Persons/ DU	80	GPD/ Person	200	GPD/DU	
LDR-3	Low Density Residential (LDR-1-2)	1.2	DU / Acre	3.0	Persons/ DU	80	GPD/ Person	240	GPD/DU	
MDR-1	Medium Density Residential (MDR 2-4)	3.0	DU / Acre	3.0	Persons/ DU	80	GPD/ Person	240	GPD/DU	
MDR-2	MDR 2-4 & MDR 4-6 AVG.	4	DU / Acre	3.1	Persons/ DU	80	GPD/ Person	248	GPD/DU	
MDR-3	Medium Density Residential (MDR 4-6)	5.0	DU / Acre	3.2	Persons/ DU	80	GPD/ Person	256	GPD/DU	
MDR-4	Medium Density Residential (MDR 6-10)	6.5	DU / Acre	2.7	Persons/ DU	80	GPD/ Person	216	GPD/DU	
HDR-1	High Density Residential (HDR 10-15)	11.0	DU / Acre	2.0	Persons/ DU	80	GPD/ Person	160	GPD/DU	
HDR-2	High Density Residential (HDR 15+)	20.0	DU / Acre	1.7	Persons/ DU	80	GPD/ Person	136	GPD/DU	
MUR-1	Mixed Use/Residential (MUR) Residential	15.0	DU / Acre	1.7	Persons/ DU	80	GPD/ Person	136	GPD/DU	

UNIT DAILY NON-RESIDENTIAL WASTEWATER FLOWS

LAND USE	Population Density		WASTEWATER DESIGN FLOWS (PER CAPITA)		NOTES
University - Boarded Student	---	---	80	GPD / Person	Source: City of Mesa approved polulation based criteria and Arizona Administrative Code, Title 18, Chapter 9.
University - Commuter Student and Staff	---	---	40	GPD / Person	
Elementary School - Student and Staff	200	Students and Staff / Acre	40	GPD / Person	
Middle School - Student and Staff	100	Students and Staff / Acre	40	GPD / Person	
Civic / Church / Library Staff	0.4	Employees / 1,000 S.F.	54	GPD / Person	
Civic / Church / Library Patrons	2	Patrons / 1,000 S.F.	20	GPD / Person	
Aquatic Center	200	Patrons and Staff / Acre	10	GPD / Person	
Commercial / Retail / Restaurant	2.5	Employees and Patrons / 1,000 S.F.	54	GPD / Person	
Office	5	Employees / 1,000 S.F.	54	GPD / Person	
Theater	250	Seats / Screen	5	GPD / Seat	
Hotel	---	---	75	GPD / Room	
Resort	---	---	150	GPD / Room	

OFFSITE

LAND USE	DWELLING UNIT DENSITY		POPULATION DENSITY		WASTEWATER DESIGN FLOWS (PER CAPITA)		UNIT DAILY WASTEWATER FLOWS		NOTES
	VALUE	UNITS	VALUE	UNITS	Value	Units	Value	Units	
CC	--	--	14.0	Employees/ Acre	54	GPD/ Employee	756	GPD/ AC	Source: City of Mesa 2009 Engineering and Design Standards and the City of Mesa 2025 General Plan
O	--	--	23.0	Employees/ Acre	54	GPD/ Employee	1,242	GPD/ AC	
RC	--	--	14.0	Employees/ Acre	54	GPD/ Employee	756	GPD/ AC	
BPI	--	--	8.0	Employees/ Acre	54	GPD/ Employee	432	GPD/ AC	
NC	--	--	11.0	Employees/ Acre	54	GPD/ Employee	594	GPD/ AC	
LI	--	--	7.0	Employees/ Acre	54	GPD/ Employee	378	GPD/ AC	
MUE	--	--	15.0	Employees/ Acre	54	GPD/ Employee	810	GPD/ AC	
GI	--	--	15.0	Employees/ Acre	54	GPD/ Employee	810	GPD/ AC	
OFFUPSTREAM	1,040,576 GPD / 1470 Acres = 708 GPD/AC						708	GPD/ AC	Source: *Master Wastewater Report for Ray Road Sewer Between Ellsworth and Mountain Roads*, by CMX, 11/18/2005.

Description	Value	Units	Note(s)
General			
Minimum Velocity (d/D=2/3)	2	ft/sec	1
Maximum Flow Velocity (d/D=2/3)	9	ft/sec	1
Maximum Peak Flow Depth-to-Diameter Ratio (d/D)	0.67	-	
Minimum Pipe Diameter	8	in	1
Manning's "n" value	0.013	-	2
Peaking Factor (ADF< 1.0 MGD)	3		1
Peaking Factor (1.0 < ADF< 10.0 MGD)	2.5		1
Peaking Factor (10.0 < ADF< 20.0 MGD)	2.3		1

Notes:
1. *Per The City of Mesa 2012 Engineering & Design Standards*
2. Title 18, Chapter 9 of the Arizona Administrative Code

TABLE 11 – DU 5 East Modeled Land Use

TABLE 12 – DU 5 East Wastewater Design Criteria

TABLE 11-DU 5 East Modeled Land Use

Project: DU 5 East at Eastmark
Location: Mesa, Arizona

Proj. Number: 144173
Proj. Engineer: Dan Matthews, P.E.

PRELIMINARY LAND USE AND DWELLING UNIT BREAKDOWN BY PARCEL

Parcel	No. of DUs	Residential Acres	Density (DU/AC)	Non-Residential Acres	Commercial/ Industrial/ Retail S.F.	Land Use	Unit Daily Wastewater Flow (GPD/AC)[2]	Avg Day[1]
DU-5E	–	--	--	82.0	1,000,000	INDUSTRIAL	9,756	800,000
DU 5 East Totals	**0**	**0.0**		**82.0**	**1,000,000**			**800,000**

Notes:

1) Estimated wastewater design flows under full build-out conditions were estimated for DU 5 East based on water demands estimated by others and were provided to Wood/Patel by DMB Mesa Proving Grounds, LLC. The potential user did not provide the anticipated wastewater dishcharges for the proposed site uses; therefore, the estimated average daily wastewater demand was assumed to be 80% of the average daily water demand provided of 1.0 million gallons per day (MGD).

2) The unit daily wastewater flow is calculated by taking the average day flow divided by the non-residential acres. The result is a unit daily wastewater flow in gallons per day per acre.

Project: DU 5 East at Eastmark
Location: Mesa, Arizona
References: 2012 City of Mesa Engineering Design Standards and City of Mesa Approved Population Based Criteria

Proj. Number: 144173
Proj. Engineer: Dan Matthews, P.E.

UNIT DAILY RESIDENTIAL WASTEWATER FLOWS

LAND USE CATEGORY	LAND USE	DWELLING UNIT DENSITY		POPULATION DENSITY		WASTEWATER DESIGN FLOWS (PER CAPITA)		UNIT DAILY WASTEWATER FLOWS		NOTES
LDR-1	Low Density Residential (LDR 0-1)	0.5	DU / Acre	2.5	Persons/ DU	80	GPD/ Person	200	GPD/DU	Source: Dwelling unit density divisions are based on City of Mesa 2025 General Plan. Unit wastewater flows are based on the City of Mesa 2012 Engineering and Design Standards.
LDR-2	LDR 0-1 & LDR 1-2 AVG.	1	DU / Acre	2.5	Persons/ DU	80	GPD/ Person	200	GPD/DU	
LDR-3	Low Density Residential (LDR-1-2)	1.2	DU / Acre	3.0	Persons/ DU	80	GPD/ Person	240	GPD/DU	
MDR-1	Medium Density Residential (MDR 2-4)	3.0	DU / Acre	3.0	Persons/ DU	80	GPD/ Person	240	GPD/DU	
MDR-2	MDR 2-4 & MDR 4-6 AVG.	4	DU / Acre	3.1	Persons/ DU	80	GPD/ Person	248	GPD/DU	
MDR-3	Medium Density Residential (MDR 4-6)	5.0	DU / Acre	3.2	Persons/ DU	80	GPD/ Person	256	GPD/DU	
MDR-4	Medium Density Residential (MDR 6-10)	6.5	DU / Acre	2.7	Persons/ DU	80	GPD/ Person	216	GPD/DU	
HDR-1	High Density Residential (HDR 10-15)	11.0	DU / Acre	2.0	Persons/ DU	80	GPD/ Person	160	GPD/DU	
HDR-2	High Density Residential (HDR 15+)	20.0	DU / Acre	1.7	Persons/ DU	80	GPD/ Person	136	GPD/DU	
MUR-1	Mixed Use/Residential (MUR) Residential	15.0	DU / Acre	1.7	Persons/ DU	80	GPD/ Person	136	GPD/DU	

UNIT DAILY NON-RESIDENTIAL WASTEWATER FLOWS

LAND USE	Population Density		WASTEWATER DESIGN FLOWS (PER CAPITA)		NOTES
University - Boarded Student	---	---	80	GPD / Person	Source: City of Mesa approved polulation based criteria and Arizona Administrative Code, Title 18, Chapter 9.
University - Commuter Student and Staff	---	---	40	GPD / Person	
Elementary School - Student and Staff	200	Students and Staff / Acre	40	GPD / Person	
Middle School - Student and Staff	100	Students and Staff / Acre	40	GPD / Person	
Civic / Church / Library Staff	0.4	Employees / 1,000 S.F.	54	GPD / Person	
Civic / Church / Library Patrons	2	Patrons / 1,000 S.F.	20	GPD / Person	
Aquatic Center	200	Patrons and Staff / Acre	10	GPD / Person	
Commercial / Retail / Restaurant	2.5	Employees and Patrons / 1,000 S.F.	54	GPD / Person	
Office	5	Employees / 1,000 S.F.	54	GPD / Person	
Theater	250	Seats / Screen	5	GPD / Seat	
Hotel	---	---	75	GPD / Room	
Resort	---	---	150	GPD / Room	

OFFSITE

LAND USE	DWELLING UNIT DENSITY		POPULATION DENSITY		WASTEWATER DESIGN FLOWS (PER CAPITA)		UNIT DAILY WASTEWATER FLOWS		NOTES
	VALUE	UNITS	VALUE	UNITS	Value	Units	Value	Units	
CC	--	--	14.0	Employees/ Acre	54	GPD/ Employee	756	GPD/ AC	Source: City of Mesa 2009 Engineering and Design Standards and the City of Mesa 2025 General Plan
O	--	--	23.0	Employees/ Acre	54	GPD/ Employee	1,242	GPD/ AC	
RC	--	--	14.0	Employees/ Acre	54	GPD/ Employee	756	GPD/ AC	
BPI	--	--	8.0	Employees/ Acre	54	GPD/ Employee	432	GPD/ AC	
NC	--	--	11.0	Employees/ Acre	54	GPD/ Employee	594	GPD/ AC	
LI	--	--	7.0	Employees/ Acre	54	GPD/ Employee	378	GPD/ AC	
MUE	--	--	15.0	Employees/ Acre	54	GPD/ Employee	810	GPD/ AC	
GI	--	--	15.0	Employees/ Acre	54	GPD/ Employee	810	GPD/ AC	
OFFUPSTREAM	1,040,576 GPD / 1470 Acres = 708 GPD/AC						708	GPD/ AC	Source: *Master Wastewater Report for Ray Road Sewer Between Ellsworth and Mountain Roads*, by CMX, 11/18/2005.

Description	Value	Units	Note(s)
General			
Minimum Velocity (d/D=2/3)	2	ft/sec	1
Maximum Flow Velocity (d/D=2/3)	9	ft/sec	1
Maximum Peak Flow Depth-to-Diameter Ratio (d/D)	0.67	-	
Minimum Pipe Diameter	8	in	1
Manning's "n" value	0.013	-	2
Peaking Factor (ADF< 1.0 MGD)	3		1
Peaking Factor (1.0 < ADF< 10.0 MGD)	2.5		1
Peaking Factor (10.0 < ADF< 20.0 MGD)	2.3		1

Notes:
1. *Per The City of Mesa 2012 Engineering & Design Standards*
2. Title 18, Chapter 9 of the Arizona Administrative Code

TABLE 13

Overall Eastmark Modeled Land Use

TABLE 13 - OVERALL EASTMARK MODELED LAND USE

Project: Eastmark
Location: Mesa, Arizona

Proj. Number: 144173
Proj. Engineer: Dan Matthews, P.E.

EASTMARK - PRELIMINARY RESIDENTIAL LAND USE AND DWELLING UNIT BREAKDOWN

Land Use	LDR-2	LDR-3	MDR-1	MDR-2	MDR-3	MDR-4	HDR-1	HDR-2	**Residential Total**	Mixed Use Residential Acres/Units	**Total Residential Units**
Acreage	78.0	20.0	900.6	114.7	83.9	61.5	35.0	350.2	**1,643.9**	52.4	---
Dwelling Units	78	39	2,977	481	438	400	385	7,002	**11,800**	3,200	**15,000**

EASTMARK - WASTEWATER FLOW CALCULATIONS

Development Unit	Total Area (AC)	Residential (AC)	Total Dwelling Units	Hotel/ Resort Keys[1]	Gross Non-Residential[2] (AC)	Total Floor Area (sq. ft.)	Education (AC)	Church (AC)	Civic (AC)	Other (AC)	Avg. Day Wastewater Flow (GPD)[3]	Development Unit Flow Area (AC)	Unit Daily Wastewater Flow (GPD/AC)
1	129.7	0.0	2,000	500	105.8	2,250,000	0.0	0.0	0.0	15.9	779,000	129.7	6,006.2
2	205.0	81.5	2,000	0	69.1	1,848,000	5.5	0.0	0.0	54.4	725,946	205.0	3,541.2
3S	92.3	92.3	391	0	0.0	0	0.0	0.0	0.0	0.0	97,040	92.3	1,051.4
3/4	608.3	228.0	4,559	150	116.0	2,728,680	176.0	0.0	31.0	27.4	2,590,610	608.3	4,258.8
5E	82.0	--	--	--	82.0	1,000,000	--	--	--	--	800,000	82.0	9,756.1
5	384.6	163.2	1,071	5500	45.1	6,098,320	0.0	0.0	0.0	43.3	1,244,550	384.6	3,236.0
6N	272.5	0.0	0	0	272.5	5,360,000	0.0	0.0	0.0	0.0	3,157,352	272.5	11,586.6
6S	277.5	153.0	1,578	0	60.6	250,000	5.0	12.5	0.0	63.9	279,808	277.5	1,008.3
7	575.5	475.8	1,958	0	5.5	265,000	20.0	13.5	2.5	58.2	495,319	575.5	860.7
8	198.8	192.0	535	0	0.0	0	0.0	0.0	0.0	35.0	128,400	198.8	645.9
9	327.8	258.1	908	0	0.0	200,000	0.0	0.0	12.4	22.3	155,324	327.8	473.8
Subtotal:	**3,154.0**	**1,643.9**	**15,000**	**6,150**	**758.6**	**20,000,000**	**206.5**	**26.0**	**45.9**	**320.4**	**10,453,349**	**3,154.0**	---

[1] Anticipated number of "Keys" represents hotel and resort uses. This includes approximately 8 acres within DU-1, 133 acres within DU-5, and 2.5 acres within DU 3/4.

[2] Non-residential wastewater flows are calculated based on actual land use where detailed information is known and estimated square feet on the remainder.

[3] The Average Day Wastewater demand for **DU 1** was calculated by the following: 2,000 Mixed Use DU*136 GPD/DU + 500 Hotel Rooms*150 GPD/Room + 1,000,000 SF*(2.5 Employees/1000 SF)*54 GPD/Person + 1,100,000 SF*(5 employees/1000 SF)*54 GPD/Person = 779,000 GPD. The Average Day Wastewater Flow for **DU 2** was calculated by the following: 61.5 Acres (MDR-4) * 6.5 DU/Acre*216 GPD/DU + 20.0 Acres (HDR-2)*20 DU/Acre*136 GPD/DU + 1200 Mixed Use DU*136 GPD/DU + 800,000 SF *(2.5 employees/1000 SF)*54 GPD/employee + 1,000,000*(5 employees/1000 SF)*54 GPD/employee + 5.5 Acres*200 Students/Acre*40 GPD/Person = 725,946 GPD. The Average Day Wastewater Flow for **DU 5** was calculated by the following: 121 Acres (MDR-1) * 3 DU/ACRE*240 GPD/DU + 15.0 Acres (HDR-1) * 11 DU/Acre*160 GPD/DU + 27.2 Acres (HDR-2) * 20 DU/Acre*136 GPD/DU + 500 Hotel Rooms * 75 GPD/Room + 5,000 Resort Rooms * 150 GPD/Room + 100,000 SF*(2.5 Employees/1000 SF)*54 GPD/Person + 948,320 SF*(5 Employees/1000 SF)*54 GPD/Person = 1,244,550 GPD. The Average Day Wastewater Flow for **DU 6S** was calculated by the following: 78 Acres (LDR-2) *1 DU/Acre *200 GPD/DU + 75 Acres (HDR-2) * 20 DU/Acre * 136 GPD/DU + 100,000 SF*(2.5 Employees/1000 SF)*54 GPD/Person + 5 Acres(School) * 200 Students/Acre * 40 GPD/Person + 12.5 Acres (Church) * 43560 * 0.2/1000 * (0.4 Employeess/1000 SF) * 54 GPD/Person + 12.5 Acres (Church) * 43560 * 0.2/1000 * (2 Patrons/1000 SF) * 20 GPD/Person = 279,808 GPD.

TABLE 14

Wastewater Model, Full Build-Out Condition

TABLE 14 - WASTEWATER MODEL, FULL BUILD OUT CONDITION

Project: Eastmark
Location: Mesa, Arizona
References: City of Mesa 2012 Engineering and Design Standards
Arizona Administrative Code, Title 18, Chapter 9

Proj. Number: 144173
Proj. Engineer: Dan Matthews, P.E.

FROM NODE	TO NODE	SEWER AREA(S) SERVED	AREA SERVED (ACRES)	UNIT FLOW (GPD/AC)	PARCEL ADF (GPD)	SEWER NODE ADF (GPD)	TOTAL ADF (GPD)	PEAKING FACTOR	PEAK WET WEATHER FLOW (GPD)
Elliot Road Onsite Wastewater Flows									
E3	E2	DU-6C	129.7	11,485.0	1,489,541	1,489,541	1,489,541	2.5	3,723,853
E2	E1	DU-6A	89.1	10,360.0	923,040	1,667,811	3,157,352	2.5	7,893,380
		DU-6B	53.7	13,869.0	744,771				
E5	E4	DU-6E	82.0	9,756.0	800,000	800,000	800,000	3.0	2,400,000
Total to Elliot Road Outfall			**354.5**		**3,957,352**	**3,957,352**	**3,957,352**		**10,293,380**
Warner Road Onsite Wastewater Flows									
W4B	W4A	DU 5A	29.9	3,236.0	96,756	318,422	318,422	3.0	955,266
		1/4 DU 5B	32.3	3,236.0	104,523				
		1/3 DU 5D	36.2	3,236.0	117,143				
W4A	W3	DU-1A	50.7	6,006.2	304,514	304,514	622,936	3.0	1,868,808
W3	W2	DU-1C	21.9	6,006.2	131,536	131,536	754,472	3.0	2,263,416
W5	W2	DU-1B	57.1	6,006.2	342,954	454,856	454,856	3.0	1,364,568
		DU-2A	31.6	3,541.2	111,902				
W2	W1	DU-2B	15.4	3,541.2	54,534	296,044	1,505,372	2.5	3,763,430
		DU-2D	68.2	3,541.2	241,510				
W10	W9	1/4 DU-5B	32.3	3,236.0	104,523	104,523	104,523	3.0	313,569
W9	W7	1/2 DU-5B	64.5	3,236.0	208,722	326,836	431,359	3.0	1,294,077
		1/2 DU-5C	36.5	3,236.0	118,114				
W8B	W8A	DU-5F	29.2	3,236.0	94,491	259,527	259,527	3.0	778,581
		DU-5G	14.8	3,236.0	47,893				
		1/3 DU-5D	36.2	3,236.0	117,143				
W8A	W7	1/3 DU-5D	36.2	3,236.0	117,143	235,257	494,784	3.0	1,484,352
		1/2 DU-5C	36.5	3,236.0	118,114				
W7	W6	DU-2C	89.8	3,541.2	318,000	358,000	1,284,143	2.5	3,210,358
		3/4-1	10.0	4,000.0	40,000				
W6	W1	3/4-2	23.0	2,720.0	62,560	62,560	1,346,703	2.5	3,366,758
W1	WARNER ROAD SEWER	--	--	--	--	--	2,852,075	2.5	7,130,188
Total to Warner Road Outfall at Ellsworth Road			**752.3**		**2,852,075**	**2,852,075**	**2,852,075**		**7,130,188**
Ray Road Onsite And Offsite Upstream Wastewater Flows									
R4	R3	(1/3) 3/4-11	9.8	10,322.4	101,160	101,160	101,160	3.0	303,480
R6	R5	3/4-3	58.9	--	--	43,080	43,080	3.0	129,240
		3/4-4	5.0	8,000.0	40,000				
		3/4-5	15.0	205.3	3,080				
R5	R3	3/4-6[1]	16.0	2,000.0	32,000	414,400	457,480	3.0	1,372,440
		3/4-7	49.0	7,804.1	382,400				
R3	R2	(2/3) 3/4-11[1]	19.7	10,270.1	202,320	330,840	889,480	3.0	2,668,440
		3/4-12	12.5	10,281.6	128,520				
R12	R11	DU-6D	50.5	1,008.3	50,919	82,479	82,479	3.0	247,437
		1/2 DU-6E	31.3	1,008.3	31,560				
R11	R10	1/2 DU-6E	31.3	1,008.3	31,560	31,560	114,039	3.0	342,117
R10	R9	DU-6F	51.5	1,008.3	51,927	74,513	188,552	3.0	565,656
		DU-6G	22.4	1,008.3	22,586				
R9	R8	3/4-8	32.0	2,720.0	87,040	87,040	275,592	3.0	826,776
R8	R7	(1/2) 3/4-9	56.0	7,460.7	417,800	653,000	928,592	3.0	2,785,776
		(1/2) 3/4-10	86.5	2,719.1	235,200				
R7	R2	(1/2) 3/4-9	56.0	7,460.7	417,800	417,800	1,346,392	2.5	3,365,980
R2	R1	(2/3) 3/4-13[1]	30.0	4,567.3	137,020	137,020	2,372,892	2.5	5,932,230
R24	R22	DU-6H	90.5	1,008.3	91,251	147,486	147,486	3.0	442,458
		7-8	23.5	1,307.2	30,720				
		7-9	23.1	841.6	19,440				
		7-10	7.5	810.0	6,075				
R23	R22	7-6	18.5	493.0	9,120	90,480	90,480	3.0	271,440
		7-7	26.8	877.6	23,520				
		7-11	24.4	1,416.4	34,560				
		7-12	23.0	1,012.2	23,280				
R22	R21	--	--	--	--	--	237,966	3.0	713,898
R21	R20	7-13	19.2	975.0	18,720	85,420	323,388	3.0	970,158
		7-14	17.3	735.3	12,720				
		7-15	18.4	756.5	13,920				
		7-23	20.0	1,760.0	35,200				
		7-24	6.0	810.0	4,860				
R20	R19	7-16	26.4	963.6	25,440	66,984	390,370	3.0	1,171,110
		7-17	20.1	1,260.9	25,344				
		7-22	20.0	810.0	16,200				
		7-27	29.3	--	--				
R19	R16	7-18	29.1	701.0	20,400	93,336	483,706	3.0	1,451,118
		7-19	23.8	1,038.7	24,720				
		7-20	19.9	964.8	19,200				
		7-21	19.0	1,061.1	20,160				
		7-25	2.5	810.0	2,025				
		7-26	5.5	1,242.0	6,831				
R18	R17	OFFUPSTREAM[2]	1,473	707.2	1,041,710	1,099,214	1,099,214	2.5	2,748,035
		7-1	15.9	1,352.5	21,504				
		7-4	32.3	624.1	20,160				
		7-5	25.1	631.1	15,840				

Project: Eastmark
Location: Mesa, Arizona
References: City of Mesa 2012 Engineering and Design Standards
Arizona Administrative Code, Title 18, Chapter 9

Proj. Number: 144173
Proj. Engineer: Dan Matthews, P.E.

FROM NODE	TO NODE	SEWER AREA(S) SERVED	AREA SERVED (ACRES)	UNIT FLOW (GPD/AC)	PARCEL ADF (GPD)	SEWER NODE ADF (GPD)	TOTAL ADF (GPD)	PEAKING FACTOR	PEAK WET WEATHER FLOW (GPD)
R17	R16	7-2	19.3	982.4	18,960	45,360	1,144,574	2.5	2,861,435
		7-3	30.7	859.9	26,400				
R16	R15	--	--	--	--	--	1,628,280	2.5	4,070,700
R16	R14	(1/2) 3/4-10	86.5	2,719.1	235,200	235,200	1,863,480	2.5	4,658,700
R40	R39	SB105	99.1	840.4	83,280	83,280	83,280	3.0	249,840
R39	R38	9-6	22.4	642.9	14,400	14,400	97,680	3.0	293,040
R38	R34	9-2	31.8	498.1	15,840	25,884	123,564	3.0	370,692
		9-3	12.4	810.0	10,044				
R36	R35	9-7	60.7	595.7	36,160	48,800	48,800	3.0	146,400
		18% of 9-5	7.2	577.8	4,160				
		33% of 9-4	16.3	520.2	8,480				
R37	R35	82% of 9-5	32.6	584.0	19,040	36,000	36,000	3.0	108,000
		67% of 9-4	33.1	512.4	16,960				
R35	R34	--	--	--	--	--	84,800	3.0	254,400
R34	R33	--	--	--	--	--	208,364	3.0	625,092
R33	R27	18% of 9-1	9.7	560.8	5,440	5,440	213,804	3.0	641,412
R32	R30	8-6	23.6	925.4	21,840	58,320	58,320	3.0	174,960
		8-7	28.2	629.8	17,760				
		42% of 8-3	10.4	623.1	6,480				
		8-5	6.8	0.0	--				
		67% of 8-4	14.0	480.0	6,720				
		26% of 8-2	7.8	707.7	5,520				
R31	R30	58% of 8-3	14.3	621.0	8,880	38,400	38,400	3.0	115,200
		56% of 8-2	16.8	700.0	11,760				
		8-1	22.9	775.5	17,760				
R30	R28	--	--	--	--	--	96,720	3.0	290,160
R29	R28	8-9	21.7	707.8	15,360	31,680	31,680	3.0	95,040
		8-8	20.0	468.0	9,360				
		33% of 8-4	6.9	487.0	3,360				
		18% of 8-2	5.4	666.7	3,600				
R28	R27	--	--	0.0	--	--	128,400	3.0	385,200
R27	R26	42% of 9-1	22.7	556.8	12,640	12,640	354,844	3.0	1,064,532
R26	R25	40% of 9-1	21.6	563.0	12,160	12,160	367,004	3.0	1,101,012
R25	R14	--	--	--	--	--	367,004	3.0	1,101,012
R42	R41	3S-2	31.4	909.6	28,560	63,040	63,040	3.0	189,120
		3S-3	30.0	1,149.3	34,480				
R41	R14	3S-1	30.9	1,100.3	34,000	34,000	97,040	3.0	291,120
R14	R13	--	--	--	--	--	2,327,524	2.5	5,818,810
R13	R1	(1/3) 3/4-13	15.0	4,567.3	68,510	1,033,676	3,361,200	2.5	8,403,000
		LDR3-1	380	720.0	273,600				
		GI-1	40	810.0	32,400				
		LI-1	318	378.0	120,204				
		MUE-1	112	810.0	90,720				
		MUE-2	7	810.0	5,670				
		MDR3-1	231	1,280.0	295,680				
		MUR1-1	62	2,040.0	126,480				
		CC-1	27	756.0	20,412				
R1	RAY ROAD SEWER	(1)	--	--	--	--	5,734,092	2.5	14,335,230
Total Onsite Flow to Elliot Road Outfall west of DU 5E			**354.5**		**3,957,352**	**3,957,352**	**3,957,352**		**10,293,380**
Total Onsite Flow to Warner Road Outfall at Ellsworth Road			**752.3**		**2,852,075**	**2,852,075**	**2,852,075**		**7,130,188**
Total Onsite Flow to Ray Road Outfall at Ellsworth Road			**2047.2**		**3,643,936**	**3,643,936**	**3,643,936**	**(1)**	**9,109,840**
Total Onsite Flow, Elliot + Warner + Ray Basins:			**3154.0**		**10,453,363**	**10,453,363**	**10,453,363**		**26,533,408**
Total to Ray Road Outfall at Ellsworth Road			**4682.7**		**5,734,092**	**5,734,092**	**5,734,092**	**(1)**	**14,335,230**

(1) Peak Wet Weather Wastewater Flow for the proposed sewer area (3/4-6) aquatic center equals the average day flow of 32,000 GPD times a peaking factor of 3. Additionally, during the draining of the pool facility, an additional capacity of 450,000 gallons over 8 hours is required by the City of Mesa Parks and Recreation. Draining the pool facility is considered a rare occurance, but for calculations during the draining of the pool facility see Notes 3, 4, and 5 on Table 16.

(2) Offsite wastewater flow within the Signal Butte Road sewer line includes flow from the Mountain Horizons and Nova Vista developments (Avg Day = 1,040,576 gpd) per the Master Wastewater Report for Ray Road Sewer Between Ellsworth and Mountain Roads, by CMX, 11/18/2005, and the City of Mesa Signal Butte/Elliot Water Campus (Avg Day = 1,134 gpd)

TABLE 15

Calculated Pipe Capacities, Full Build-Out Condition

Project: Eastmark
Location: Mesa, Arizona
References: ADEQ Bulletin No. 11
City of Mesa 2012 Engineering and Design Standards

Proj. Number: 144173
Proj. Engineer: Dan Matthews, P.E.

FROM NODE	TO NODE	NOTES	PIPE DIA. (INCHES)	MODELED PIPE SLOPE (FT / FT)	PIPE CAPACITY		PEAK FLOW RESULTS					
					GPD	GPM	PEAK WET WEATHER FLOW (GPD)	PEAK WET WEATHER FLOW (GPM)	d/D (WET WEATHER)	FLOW VELOCITY (FT/S) AT d/D=2/3	SURPLUS CAPACITY (WET WEATHER) (GPD)	PERCENT OF CAPACITY (WET WEATHER)[4]
Elliot Road Basin Pipe Sizes												
E3	E2	Proposed	24	0.0010	4,669,751	3,243	3,723,853	2,586	0.67	2.5	945,898	79.7%
E2	E1	(1) Existing	30	0.0010	8,246,208	5,728	7,893,380	5,482	0.77	2.9	354,828	95.7%
E5	E4	Proposed	21	0.0020	4,663,391	3,238	2,400,000	1,667	0.51	3.3	2,263,391	51.5%
Warner Road Basin Pipe Sizes												
W4B	W4A	Proposed	12	0.0030	1,268,982	881	955,266	663	0.65	2.8	313,716	75.3%
W4A	W3	Proposed	15	0.0038	2,617,146	1817	1,868,808	1,298	0.62	3.7	748,338	71.4%
W3	W2	Proposed	18	0.0028	3,654,596	2538	2,263,416	1,572	0.56	3.5	1,391,180	61.9%
W5	W2	Proposed	15	0.0030	2,299,916	1597	1,364,568	948	0.56	3.2	935,348	59.3%
W2	W1	Proposed	21	0.0023	4,974,284	3454	3,763,430	2,613	0.65	3.5	1,210,854	75.7%
W10	W9	Proposed	12	0.0025	1,167,463	811	313,589	218	0.36	2.5	853,894	26.9%
W9	W7	Proposed	18	0.0030	3,768,802	2617	1,294,077	899	0.40	3.7	2,474,725	34.3%
W8B	W8A	Proposed	12	0.0055	1,725,816	1198	778,581	541	0.47	3.8	947,235	45.1%
W8A	W7	Proposed	15	0.0025	2,061,994	1432	1,484,352	1,031	0.63	3.7	577,642	72.0%
W7	W6	Proposed	21	0.0025	5,129,730	3562	3,210,358	2,229	0.57	3.7	1,919,372	62.6%
W6	W1	Proposed	21	0.0025	5,129,730	3562	3,366,758	2,338	0.59	3.7	1,762,972	65.6%
Ray Road Basin Pipe Sizes												
R4	R3	(2) Proposed	12	0.0025	1,167,463	811	303,480	211	0.35	2.5	863,983	26.0%
R6	R5	Proposed	8	0.0048	541,468	376	129,240	90	0.33	2.7	412,228	23.9%
R5	R3	(3) Proposed	15	0.0044	2,775,761	1,928	1,372,440	953	0.49	3.9	1,403,321	49.4%
R3	R2	(4) Proposed	21	0.0020	4,663,391	3,238	2,668,440	1,853	0.54	3.3	1,994,951	57.2%
R12	R11	Proposed	8	0.0040	496,346	345	247,437	172	0.50	2.4	248,909	49.9%
R11	R10	Proposed	8	0.0040	496,346	345	342,117	238	0.60	2.4	154,229	68.9%
R10	R9	Proposed	10	0.0035	845,970	587	565,656	393	0.59	2.7	280,314	66.9%
R9	R8	Proposed	12	0.0030	1,268,982	881	826,776	574	0.58	2.8	442,206	65.2%
R8	R7	Proposed	18	0.0030	3,768,802	2,617	2,785,776	1,935	0.64	3.7	983,026	73.9%
R7	R2	Proposed	18	0.0040	4,339,833	3,014	3,365,980	2,337	0.66	4.2	973,853	77.6%
R2	R1	(5) Proposed	27	0.0021	9,260,737	6,424	5,932,230	4,120	0.58	4.0	3,318,507	64.1%
R24	R22	Existing	12	0.0045	1,522,778	1,057	442,458	307	0.37	3.3	1,080,320	29.1%
R23	R22	Existing	8	0.0050	564,029	392	271,440	189	0.48	2.8	292,589	48.1%
R22	R21	Existing	12	0.0045	1,522,778	1,057	713,898	496	0.48	3.3	808,880	46.9%
R21	R20	Existing	15	0.0020	1,903,379	1,322	970,158	674	0.51	2.7	933,221	51.0%
R20	R19	Existing	15	0.0020	1,903,379	1,322	1,171,110	813	0.57	2.7	732,269	61.5%
R19	R16	Existing	15	0.0020	1,903,379	1,322	1,451,118	1,008	0.66	2.7	452,261	76.2%
R18	R17	Existing	18	0.0064	5,481,895	3,807	2,748,035	1,908	0.50	5.3	2,733,860	50.1%
R17	R16	Existing	18	0.0070	5,710,307	3,965	2,861,435	1,987	0.50	5.5	2,848,872	50.1%
R16	R15	Existing	21	0.0034	6,062,408	4,210	4,070,700	2,827	0.60	4.3	1,991,708	67.1%
R15	R14	Existing	21	0.0030	5,596,069	3,886	4,658,700	3,235	0.70	4.0	937,369	83.2%
R40	R39	Proposed	10	0.0027	740,224	514	249,840	174	0.40	2.3	490,384	33.8%
R39	R38	Proposed	10	0.0027	740,224	514	293,040	204	0.43	2.3	447,184	39.6%
R38	R34	Proposed	12	0.0019	1,015,186	705	370,692	257	0.42	2.2	644,494	36.5%
R36	R35	Proposed	8	0.0033	451,224	313	146,400	102	0.39	2.2	304,824	32.4%
R37	R35	Proposed	8	0.0033	451,224	313	108,000	75	0.34	2.2	343,224	23.9%
R35	R34	Proposed	10	0.0025	704,975	490	254,400	177	0.42	2.2	450,575	36.1%
R34	R33	Proposed	15	0.0014	1,586,149	1,101	625,092	434	0.43	2.2	961,057	39.4%
R33	R27	Proposed	15	0.0014	1,586,149	1,101	641,412	445	0.44	2.2	944,737	40.4%
R32	R30	Proposed	8	0.0038	473,785	329	174,960	122	0.43	2.3	298,825	36.9%
R31	R30	Proposed	8	0.0098	767,080	533	115,200	80	0.27	3.8	651,880	15.0%
R30	R28	Proposed	8	0.0127	879,886	611	290,160	202	0.40	4.3	589,726	33.0%
R29	R28	Proposed	8	0.0038	473,785	329	95,040	66	0.31	2.3	378,745	20.1%
R28	R27	Proposed	8	0.0040	496,346	345	385,200	268	0.67	2.4	111,146	77.6%
R27	R26	Proposed	15	0.0014	1,586,149	1,101	1,064,532	739	0.60	2.2	521,617	67.1%
R26	R25	Proposed	18	0.0011	2,284,123	1,586	1,101,012	765	0.48	2.2	1,183,111	48.2%
R25	R14	Proposed	18	0.0011	2,284,123	1,586	1,101,012	765	0.48	2.2	1,183,111	48.2%
R42	R41	Proposed	8	0.0040	496,346	345	189,120	131	0.43	2.4	307,226	38.1%
R41	R14	Proposed	8	0.0050	564,029	392	291,120	202	0.51	2.8	272,909	51.6%
R14	R13	Existing	21	0.0061	8,083,211	5,613	5,818,810	4,041	0.83	5.8	2,264,401	72.0%
R13	R1	Existing	24	0.0075	12,791,056	8,883	8,403,000	5,835	0.59	7.0	4,388,056	65.7%

NOTES:

(1) Pipe segment E2 to E1 is existing and was sized by First Solar's Engineer.

(2) This pipe segment has been upsized for flexibility due to unknown phasing of offsite development planned to contribute flows to the Ray Road Sewer. The pipe size represents a scenario assuming no offsite development has occurred prior to the construction of the Warner Road Sewer allowing for higher onsite contribution in the initial condition.

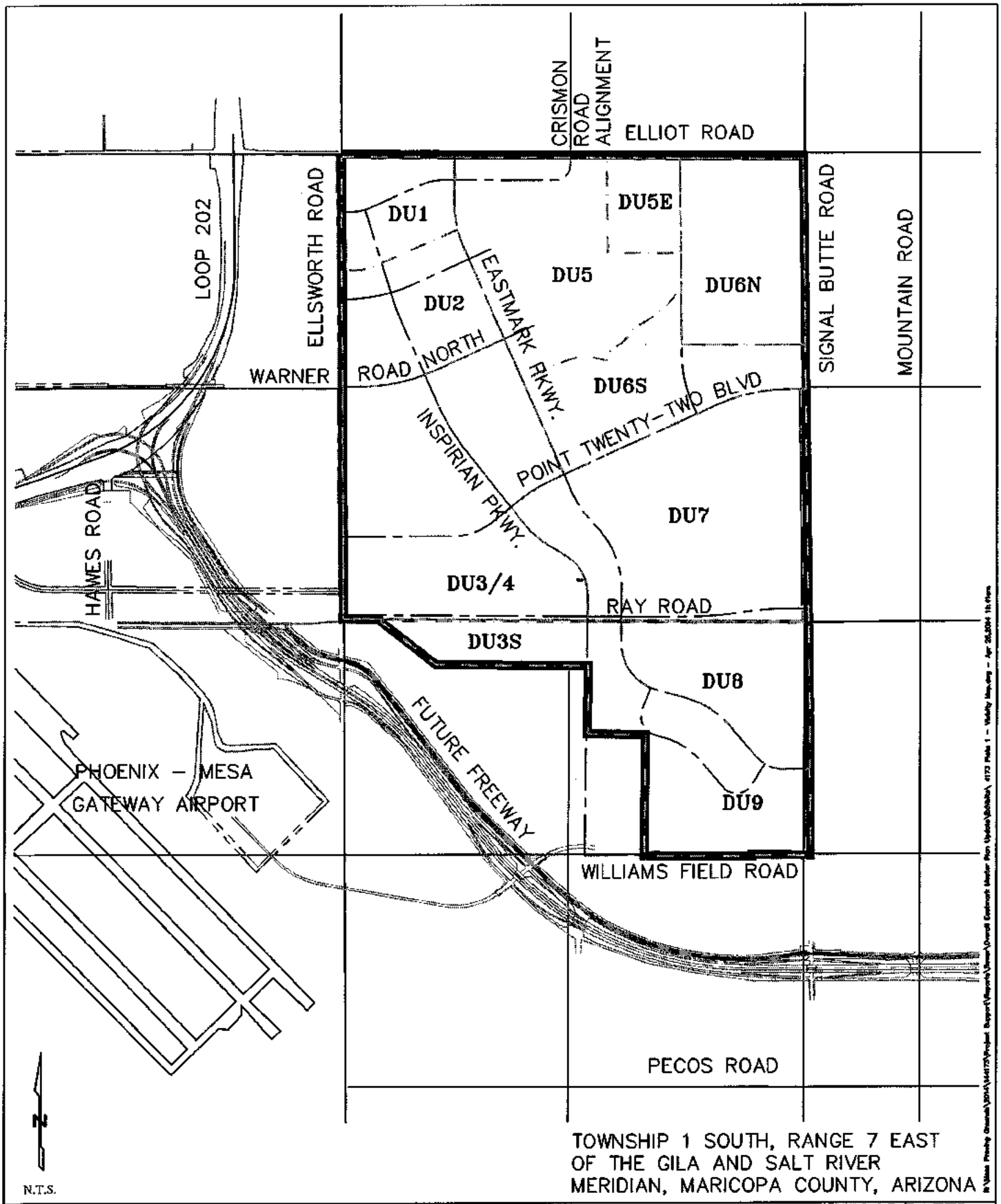
3) Peak Wet Weather Wastewater Flow for the proposed sewer area (3/4-6) aquatic center equals the average day flow of 32,000 gpd times a peaking factor of 3. However, during the draining of the pool facility, an additional capacity of 450,000 gallons over 8 hours is required by the City of Mesa Parks and Recreation. Therefore, all sewer lines downstream of node R5 have an additional 937.5 GPM (450,000 gallons/8 hours/ 60 minutes per hour) during the time the pool facility is drained. This additional flow increases the peak wet weather flow to 1,891 GPM for the pipe segment R5 to R3. The pipe has a maximum capacity of 2,068 GPM; thus, the pipe will be flowing at 92% full. Additionally, d/D= 0.80 during the draining of the pool.

4) The additional flow of 937.5 GPM during the draining of the pool facility increases the peak wet weather flow to 2,791 GPM for the pipe segment R3 to R2. The pipe has a maximum capacity of 3,421 GPM; thus, the pipe will be flowing at 82% full. Additionally, d/D = 0.73 during the draining of the pool.

5) The additional flow of 937.5 GPM during the draining of the pool facility increases the peak wet weather flow to 5,057 GPM for the pipe segment R2 to R1. The pipe has a maximum capacity of 6,851 GPM; thus, the pipe will be flowing at 74% full. Additionally, d/D = 0.67 during the draining of the pool.

PLATE 1

Vicinity Map



NOT FOR CONSTRUCTION
OR RECORDING

PLATE 1: VICINITY MAP

EASTMARK
MESA, ARIZONA

WOOD/PATEL
LAND DEVELOPMENT ● WATER RESOURCES
STRUCTURES ● TRANSPORTATION / TRAFFIC
WATER / WASTEWATER ● SURVEYING
CONSTRUCTION MANAGEMENT
2220 S. Country Club Dr.
Suite 101
Mesa, AZ 85210
(480) 834-3300
www.woodpatel.com
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PLATE 2

Master Sewer Exhibit, Full Build-Out Condition

PLATE 2 - MASTER SEWER EXHIBIT, FULL BUILD OUT CONDITION

EASTMARK
MESA, ARIZONA

PRELIMINARY
NOT FOR CONSTRUCTION
OR RECORDING

LEGEND

EXISTING SEWER / PLANNED SEWER

8" 10" 12" 15" 18" 21" 24" 27" 30" 36" 42" 48" 54" 66"

ON-SITE DEVELOPMENT UNITS

DU 1, DU 2, DU 3S, DU 3/4, DU 5, DU 5E, DU 6N, DU 6S, DU 7, DU 8, DU 9

OFF-SITE LAND USE DESIGNATIONS*

SEWER BASIN BOUNDARIES
ONSITE SEWER SUB-BASIN BOUNDARIES
ONSITE SEWER SUB-BASIN LABELS (DU-1A)
OFFSITE CONTRIBUTING SEWER BASIN (LDR3-1)
OFFSITE SEWER SUB-BASIN BOUNDARIES

* OFF-SITE LAND USE DESIGNATIONS ARE PER THE 2004 COM WWMP

OTHER

FUTURE SEWER BY OTHERS

EXISTING SEWER LIFT STATION

2500 0 1250 2500

Horz. 1 in. = 2500 ft.

WOOD/PATEL
LAND DEVELOPMENT ● WATER RESOURCES
STRUCTURES ● TRANSPORTATION / TRAFFIC
WATER / WASTEWATER ● SURVEYING
CONSTRUCTION MANAGEMENT
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Suite 101
Mesa, AZ 85210
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