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September 19, 2017

Mr. William M. Fick, P.E.  
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City of Mesa  
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Re: **Eastmark DU 5, 5 North, & 6 South - Master Wastewater Report**  
3<sup>rd</sup> Review Comments Responses  
Case number: Z17-0  
PLN number: PLN2017-00083  
WP# 164528

Dear Mr. Fick:

The following are our responses to the City's 3<sup>rd</sup> review comments on the *Master Wastewater Report Update for Eastmark*, dated August 22, 2017:

**Page 10**

Comment #1: All pipes must be sized to convey peak flow at build-out with a d/D of 0.67 or less, in accordance with the City of Mesa 2017 Design Standards Sect. 420. The peaking factor used to evaluate existing pipes, however, is less than for new pipes, per Table 4.3. This may reduce the d/D for the existing lines to meet the design criteria.

***Response #1: Peaking factors for existing sewer pipes have been revised as indicated. As a result, the d/D on the existing lines has been reduced below 0.67. The second paragraph on Page 10 has been revised accordingly.***

**Page 13**

Comment #2: Add the verbiage "from approved plats" in second paragraph on Page 13.

***Response #2: Added verbiage, as requested.***

**Page 16**

Comment #3: Add verbiage to Item 9 on Page 16, per report redline markups.

***Response #3: Additional text has been added, as requested.***



Mr. William M. Fick, P.E.

City of Mesa

**Eastmark DU 5, 5 North, & 6 South – Master Wastewater Report**

3<sup>rd</sup> Review Comments - Responses

Case number: Z17-0

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Page 2 of 2

Comment #4: Revise verbiage for Item 10 on Page 16, per report redlines.

**Response #4: *Revised verbiage, as provided by the City in our meeting on 9/18/17.***

**Additional revisions made by Wood/Patel:**

- *Revised report date on cover.*
- *On Page 2, added last bullet point addressing updated peaking factors.*
- *On Page 11, revised text in first paragraph to reflect as-built information recently received of the offsite Ray Road and Elliot Road sewers.*

Please contact our office if you have any questions or comments regarding the above responses.

Sincerely,

**Wood, Patel & Associates, Inc.**



Daniel W. Matthews, P.E.

Project Manager / Associate

DWM/km

Enclosure(s): City of Mesa Review Comments

jected full-buildout average-day wastewater flows for both Eastmark and areas upstream 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	4.30 MGD	4.30 MGD
Warner Road Outfall:	0 MGD	0 MGD	4.58 MGD	4.58 MGD
Ray Road Outfall:	1.12 MGD	0.97 MGD	2.50 MGD	4.48 MGD
<b>Total:</b>	<b>1.12 MGD</b>	<b>0.97 MGD</b>	<b>7.38 MGD</b>	<b>9.47 MGD</b>

**Sticky Note**  
 All pipe must be sized to convey peak flow at build-out with a d/D of 0.67 or less, in accordance with the City of Mesa 2017 Design Standards Sect. 420. The peaking factor used to evaluate existing pipes, however, is less than for new pipes, per Table 4.3. This may reduce the d/D for the existing lines to meet the design criteria.

Sewer pipe capacities are based upon conveying the capacity, with exception to an existing 15-inch line along Eastmark Parkway which conveys flows at 91% (d/D = 0.75) of the pipe's capacity. Copernicus Drive within DU 3/4 which conveys flows at 87% (d/D = 0.77) of the pipe's capacity, an existing 21-inch line along Ray Road which conveys flows at 81% (d/D = 0.68) of the pipe's capacity, and a proposed 8-inch line between Development Unit 8 (DU 8) and 9 which conveys flows at 79% (d/D=0.68) of the pipe's capacity. 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 19 – *Wastewater Model (First Life Cycle)*, and Table 22 – *Wastewater Model (Full-Buildout Condition)*. Results show that during the full-buildout 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 32.8 percent of the full-flow capacity with a d/D = 0.40. When the pool flow of 938 gpm is added to the peak wet-weather flow, the total sewer flow equals 1,408 gpm, which is 98-percent of the maximum capacity of the 15-inch sewer, and has a d/D equal to 0.80. Refer to Table 23 – *Calculated Pipe Capacities (Full-Buildout Condition)* for the results, and Exhibit 3 – *Master Sewer Exhibit (Full-Buildout Condition)* for pipe locations.

Basin area during the interim condition until the Warner Road sewer is constructed. In the full-buildout 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.

The trigger for the planning, design, and construction of the Warner Road offsite sewer was set by the City of Mesa when the estimated average day flow in the Ray Road sewer at Ellsworth Road and Ray Road from approved plats reaches 2.8 MGD.

#### 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. It is our understanding 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. The City indicated it is their 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~~

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-buildout 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. **When the projected average daily flow to the Ray Rd. sewer at Ellsworth Rd. from approved plats reached 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 for 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 has conducted a preliminary evaluation of the wastewater collection system downstream of Eastmark to determine if there is adequate capacity to cnvey the build-out flows presented in this report. Based on this evaluation, the Ray Rd. sewer does not have adequate capacity. The City will conduct further evaluations, with input from DMB, to confirm if improvements will be required and, if so, the extent of DMB's participation in these improvements.**

10. The City of Mesa has indicated that they have evaluated the wastewater collection system downstream of Eastmark and, based on this evaluation, the existing Ray Road sewer currently has adequate capacity to convey an average daily flow of 2.25 mgd from Eastmark at build-out. If the average daily flow to the Ray Road sewer from Eastmark is projected to exceed 2.25 mgd, the City of Mesa will re-evaluate the ability of the Ray Road sewer to convey the additional flow. If it is found that the Ray Rd. sewer does not have adequate capacity, Eastmark will be responsible for a pro-rata share (based on flow capacity) of the cost to design and construct improvements required to convey the additional flow.