MASTER
NON-POTABLE WATER
REPORT UPDATE
FOR
EASTMARK

Revised April 24, 2014
Revised February 4, 2013
Revised May 15, 2012
June 12, 2009
WP# 144173

REVIEWED BY
CITY STAFF
5/1/14 BY
DATE

WOOD/PATEL
MISSION: CLIENT SERVICE™

MASTER
NON-POTABLE WATER
REPORT UPDATE
FOR
EASTMARK

Revised April 24, 2014
Revised February 4, 2013
Revised May 15, 2012
June 12, 2009
WP# 144173

DMB® Master Developer Approval EASTMARK.

Date _____

Submitted to:

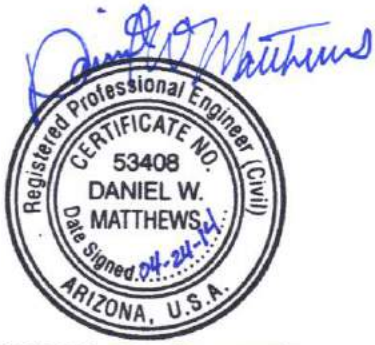
City of Mesa
55 North Center Street
P.O. Box 1466
Mesa, Arizona 85211-1466
Phone: (480) 644-3258

Prepared for:

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

Prepared By:

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



EXPIRES 06-30-2015

WOOD/PATEL
MISSION: CLIENT SERVICE™

TABLE OF CONTENTS

APPENDICES

APPENDIX A	Full Build-Out Non-Potable Water Calculations
	• Table 1 - Non-Potable Water Use and Application Rates
	• Table 2 - Non-Potable Water Calculations
	• Table 3 - Non-Potable Water Lake Fill Line Sizing
	• Table 4 – Water Demand Design Flows by Junction Node (Primary Interim Condition)
APPENDIX B	Full Build-Out Hydraulic Modeling Results
APPENDIX C	Primary Interim Non-Potable Water Modeling Results
APPENDIX D	Secondary Interim Non-Potable Water Modeling Results
APPENDIX E	City of Mesa and ADWR Memorandum of Understanding

PLATES

PLATE 1	Vicinity Map
PLATE 2	Full Build-Out Master Non-Potable Water Exhibit
PLATE 3	Primary Interim Master Non-Potable Water Exhibit
PLATE 4	Secondary Interim Master Non-Potable Water Exhibit

Km
Y:\WP\Reports\Residential\144173 Eastmark Master Non-Potable Water Report Update (for DU-5E).docx

EXPIRES 06-30-2015

EXECUTIVE SUMMARY

This report supersedes the approved *Master Non-Potable Water Report Update for Eastmark*, dated February 4, 2013, and has been prepared to specifically address revisions to the proposed non-potable water system layout. More detailed land use planning within DU 5 East (DU 5E) has been prepared and provided to Wood, Patel & Associates, Inc. (Wood/Patel) by DMB Mesa Proving Grounds, LLC. DU 5E is planned for the next phase of development within Eastmark, and is bound by Elliot Road to the north, DU 6 North to the east, and DU 5 to the south and west. Revisions to the *Master Non-Potable Water Report Update for Eastmark* include:

- Revised land uses within DU 5E were incorporated to reflect more detailed planning. The water demand for the non-potable water system has been reduced by eliminating the previously-planned golf course.

- The reduction in non-potable water demand allows for a 12-inch non-potable waterline to be installed from the Central Arizona Project (C.A. P.) treatment plant to the onsite Great Park lakes. This is a reduction from the previously-planned 16-inch non-potable waterline.

- Once the Full Build-Out Non-Potable Water System Condition improvements are constructed, the Site will utilize raw water, delivered as Central Arizona Project (C.A.P.) water, for the primary non-potable water source.

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

1.0 INTRODUCTION

1.1 General Background and Project History

Eastmark, formerly known as Mesa Proving Grounds (Site), is anticipated to be a 3,155-acre master planned community in the City of Mesa. 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, industrial uses, resort, various community uses, and open spaces. This *Master Non-Potable Water Report Update for Eastmark* utilizes a plan provided by DMB Mesa Proving Grounds, LLC for anticipated non-potable irrigated land uses throughout the Site.

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 Non-Potable Water Report Update

The intent of this Master Non-Potable Water Report Update is to establish design criteria, determine non-potable water design flows based on estimated irrigation requirements, and present the non-potable water infrastructure necessary to serve the Site during primary and secondary interim conditions and the full build-out condition. The planned Development Unit 7 (DU 7) and Development Unit 3/4 (DU 3/4) potable water infrastructure and a dedicated lake fill waterline, backflow device, valves and meter, and component system will be utilized as the Primary Interim Condition System to fill the existing 1-acre lake and proposed 3-acre lake located in the first and second phases of the Great Park. Water from the lakes will be utilized to irrigate the first and second phases of the Great Park (refer to Plate 3 – *Primary Interim Master Non-Potable Water Exhibit*).

The City of Mesa plans to develop a non-potable groundwater production backup well along the south side of Elliot Road between Crismon Road and Signal Butte Road. Once the City of Mesa has installed the non-potable groundwater production backup well, the well will be connected to a temporary overland waterline, valve and meter, and component system and will be utilized as the Secondary Interim Condition System to fill

the lakes located in the first and second phases of the Great Park (refer to Plate 4 – *Secondary Interim Master Non-Potable Water Exhibit*).

The Full Build-Out Non-Potable Water System Condition improvements include the new non-potable groundwater production well, two (2) Great Park storage lakes, non-potable waterlines, valves and meters, and component system. Once the Full Build-Out Non-Potable Water System Condition improvements are constructed, the Site will utilize raw water delivered as Central Arizona Project (C.A.P.) water for the primary non-potable water source. This is possible because the City of Mesa and Arizona Department of Water Resources (ADWR) agreed to a Memorandum of Understanding which describes in detail the delivery of the water. Refer to Appendix E for a copy of the Memorandum.

The Site is being planned as a Planned Community District (PCD). There are nine (9) Development Units that comprise the PCD. The *Master Non-Potable Report for Eastmark* utilizes a Conceptual Land Use Plan provided by DMB Mesa Proving Grounds, LLC for anticipated service areas of the proposed non-potable water system.

The Full Build-Out Condition System is proposed to provide landscape irrigation to the Great Park. In the event the proposed landscape irrigation demands significantly change, or if additional non-potable water landscape irrigation demands are identified, updates to the Master Non-Potable Water Report will be submitted to the City for review and approval. Basis of design reports for the construction of the Full Build-Out Condition System shall provide a more detailed analysis of the system.

1.3 Existing Topographic Conditions

The Site consists of multiple automotive test tracks, a small group of commercial/industrial buildings, and undisturbed desert previously used by General Motors as a desert automotive testing facility. The majority of the Site is surrounded by undeveloped desert along the northern, western, and southern boundaries. The eastern boundary is bordered by two residential developments that have recently been constructed or are currently under construction, including Nova Vista and Bella Via (formerly known as Mountain Horizons). The Site 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 intersection of Ray Road and Ellsworth Road.

1.4 Full Build-Out Non-Potable Water System Overview

Currently, the City of Mesa is planning to construct a raw waterline from the C.A.P. canal to the future South C.A.P. Water Treatment Plant located near the northeast corner of the Signal Butte Road and Elliot Road intersection. It is anticipated that a non-potable waterline to supply Eastmark will be connected upstream of the treatment plant. From this point, non-potable water will be conveyed to storage lakes located within the Great Park (refer to Plate 2 – *Full Build-Out Master Non-Potable Water Exhibit*).

The lake-fill waterlines will discharge non-potable water through water meters and air gap structures to each lake. Pump stations located at the Great Park will be used to pressurize the irrigation systems under normal conditions. The City of Mesa will install, operate, and maintain the non-potable waterlines, valves and meters, and components from the C.A.P. Canal to the future South C.A.P. Water Treatment Plant. The City of Mesa will also install, operate, and maintain the non-potable waterlines, valves, and meters, and components located in public right-of-way from the future South C.A.P. Water Treatment Plant to the public Great Park property line. Eastmark or an assignee will install the onsite non-potable waterlines, valves and meters, components and irrigation pump stations located within the Great Park. The City of Mesa or an assignee will operate and maintain the Great Park irrigation pump systems installed by Eastmark.

1.5 Full Build-Out Non-Potable Water Sources

Eastmark will utilize raw water delivered to the Site through a gravity transmission main from the C.A.P. as the primary non-potable water source. In the event of a C.A.P. outage or dry-up, the storage lakes and a non-potable groundwater production well will serve as the non-potable water sources for the Great Park. The City is planning to construct up to six (6) groundwater production wells within the Site consisting of up to five (5) groundwater production wells for potable water and one (1) non-potable groundwater production well. It is anticipated five (5) potable water wells will be constructed, and the non-potable groundwater production well would be available as backup supply during times when C.A.P. water is unavailable. This well is currently planned to be located near the north portion of the Site, however, the actual location may vary. The planned non-

potable groundwater production well may also include provisions for injection of chlorine or other disinfectants to control biological growth in downstream piping. Refer to the *Eastmark Master Water Report Update,* dated April 15, 2014, for the approximate planned locations of the potable groundwater production wells.

1.6 Primary Interim Condition Non-Potable Water System Overview

Construction of the planned full build-out of the non-potable water system proposed in this report is not anticipated to coincide with the development of the second phase of the Great Park. The first phase of the Great Park is currently under construction and includes the portion of the park located between Point Twenty-Two Boulevard south to Ray Road, and consists of approximately 32 net acres. The second phase of the Great Park is anticipated to include the portion of the park located between Warner Road South to Point Twenty-Two Boulevard, and consists of approximately 59 acres.

A 1-acre lake has been constructed as part of the first phase of the Great Park, and will provide water storage for approximately 15 acres of turf and 17 acres of low-water use plants/gardens. A pump station has been constructed to provide pressure to the irrigation system. Dedicated lake fill lines at the first phase of the Great Park are connected to the City's potable water system. As outlined in the Master Water Report for Eastmark, a 20-inch potable waterline has been constructed within Eastmark Parkway adjacent to the first phase of the Great Park. An 8-inch lake fill waterline has been constructed from the 20-inch potable waterline to the existing 1-acre Great Park lake. In the future, the lake fill lines will be valved-off/disconnected from the potable water line located in Eastmark Parkway. The lake fill lines will then be connected to the Secondary Interim Condition System once it is constructed. The existing and future backflow preventers, air gaps, and valving, consistent with ADEQ standards for these types of connections, shall be utilized to allow for future potable water as a backup in case of an emergency due to malfunctions of the non-potable delivery system.

A proposed 3-acre lake will be developed as part of the second phase of the Great Park, and will provide water storage for approximately 40 acres of turf and 12 acres of low-water use plants/gardens. Similar to the first phase of the Great Park, a pump station will be constructed, and the dedicated lake fill lines are anticipated to be connected to the City's potable water system. As outlined in the *Master Water Report Update for*

Eastmark, a 20-inch potable waterline is planned to be constructed within Eastmark Parkway to Point Twenty-Two Boulevard. An 8-inch lake fill waterline will be extended from the 20-inch potable waterline to the second phase of the Great Park lake. In the future, the lake fill lines will be valved-off/disconnected from the potable waterline located in Eastmark Parkway. The lake fill lines will then be connected to the Secondary Interim Condition System once it is constructed. Backflow preventers, air gaps, and valving, consistent with ADEQ standards for these types of connections, shall be utilized to allow for future potable water as a backup in case of an emergency, due to malfunctions of the non-potable delivery system.

1.7 Primary Interim Condition Non-Potable Water Source

Eastmark will utilize the City of Mesa potable water to the 1-acre first phase Great Park lake and the 3-acre second phase Great Park lake.

1.8 Secondary Interim Condition Non-Potable Water System Overview

The Secondary Interim Condition System will utilize a non-potable groundwater production well that will be constructed by the City of Mesa, and a temporary overland waterline connected from the well to the first and second phases of the Great Park lake.

Once the non-potable groundwater production well is constructed, the dedicated lake fill lines will be disconnected from the potable water system and connected to the non-potable waterline.

1.9 Secondary Interim Condition Non-Potable Water Source

Eastmark will utilize the proposed City of Mesa non-potable groundwater production well after it is constructed to fill the first phase Great Park 1-acre lake and the second phase Great Park 3-acre lake.

1.10 Sustainability Techniques

Eastmark is intended 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 upon approval by the City as outlined in the Community Plan.

2.0 SYSTEM DESIGN

2.1 Turf and Low-Water Use Areas

Landscape areas are based on land use data provided by Eastmark. Landscape areas have been divided into two (2) water demand categories, including turf areas and low-water use areas. The Great Park shall be developed in two (2) phases. The first phase includes a recently constructed 1-acre lake and up to 15 acres of turf, and 17 acres of low-water use landscaping. The second phase will include a planned 3-acre lake, up to 40 acres of turf, and 12 acres of low-water use landscaping.

Actual Great Park land uses and programming may vary from the conceptual plan presented in this report. Any significant changes will be identified in future updates to this Master Non-Potable Water Report and Basis of Design Reports. The system will be designed to adequately serve the planned uses. Currently, the school use areas are planned for ball fields, which will also be irrigated by the non-potable water system. The economic feasibility of increasing the capacity and extending the non-potable water system to irrigate other areas will be evaluated as development progresses.

2.2 Unit Water Demands for Irrigation

The amount of water lost through soil infiltration, evaporation, and plant transpiration will be replaced through irrigation. The rate of irrigation application has been determined using standardized evapotranspiration (ET_o) values for various weather stations throughout the state from the Arizona Meteorological Network (AZMET). The irrigation rate is determined by multiplying published ET_o values by an appropriate crop coefficient (K_c). Refer to *Table 1 – Non-Potable Water Use and Application Rates*, located in Appendix A, for the selected crop coefficients and calculated irrigation application rates. The turf ET_o value for the month of October was increased to account for additional water use during the over-seeding period of the Great Park.

2.3 Lake Evaporation

Lake evaporation must be considered when determining water demands for the Great Park. On average, the City of Mesa experiences a pan evaporation rate of 7.9 inches per month, which describes the decrease in the water surface elevation of a standard four foot diameter pan over a given month. To determine the evaporation rate for a lake, the pan

evaporation rate is adjusted by multiplying the monthly rate by a factor of 0.8. Refer to Table 1 for monthly lake evaporation rates.

2.4 Delivery of Non-Potable Water

Non-potable water system delivery presented in this plan is based on the following design conditions:

- Irrigation will occur seven (7) days per week.
- Interim-condition demands will be satisfied by:
  - Primary Interim Condition – potable water system
  - Secondary Interim Condition – new non-potable groundwater production well and temporary fill line
- Under the Full Build-out Non-Potable Water System Condition the C.A.P. canal will supply non-potable water to the Great Park lakes during a 10-hour/day period.

During a C.A.P. canal dry-up, the Great Park lakes fill times will extend to 24-hours/day.

2.5 Pipe Flow Velocities

Non-potable water pipes are sized with an approximate maximum flow velocity of 5 feet per second (fps) to minimize head losses and water hammer.

2.6 Non-Potable Water Storage

Non-potable water systems must provide sufficient operational storage to accommodate fluctuations in supply and demand. The biggest fluctuations are anticipated to occur during October, when the Great Park typically overseeds the turf areas. During the overseeding period, non-potable water demands may be significantly increased.

2.7 Non-Potable Water Pump Station

2.7.1 Great Park Irrigation Pump Stations

Non-potable water pump stations will be located within the Great Park. The pump stations will be utilized to pressurize the non-potable water irrigation systems for the Great Park.

2.8 C.A.P. Dry-Up Scenario

In the Full Build-Out Non-Potable Water System Condition, in the event of a C.A.P. dry-up, the Great Park lakes will provide storage backup for their respective facilities and, additionally, the non-potable well will provide backup. The dedicated non-potable well as discussed in Section 1.5 will pump into the lake fill lines to convey non-potable water to each lake as needed. A valve will be installed to isolate the C.A.P. supply pipe during this scenario. The lake fill times will be extended to 24 hours/day during an outage. If an outage occurs during peak overseeding demands and the single well has inadequate capacity to meet these demands due to hydrogeologic limitations, the Great Park lakes will be drawn down to meet these demands.

3.0 IRRIGATION DEMANDS AND NON-POTABLE WATER SUPPLY

3.1 Irrigation Demands

Table 2 in Appendix A presents the irrigation demand design flows for the full build-out of the future Great Park. These demands are calculated using the landscape areas and unit demands outlined in Sections 2.1, 2.2, and 2.3 of this report. The first phase of the Great Park landscaping has an estimated approximate peak demand of 170,000 gpd in October, and a demand of 30,000 gpd in December. The second phase of the Great Park landscaping has an estimated approximate peak demand of 440,000 gpd in October, and a demand of 80,000 gpd in December.

3.2 Non-Potable Water Supply (Full Build-Out System Condition)

As discussed in Section 1.5, the Site will be supplied non-potable water primarily by a gravity pipe conveying C.A.P. water. The Great Park lake will be supplied with water from the gravity system. The lakes will provide storage backup during outages for their respective facility; however, the single non-potable groundwater production well will be the primary backup supply. According to City staff, the reported production of Desert Well #13 and Desert Well #16, located near the Site, are approximately 1,300 gallons per minute (gpm) and 763 gpm, respectively. Eastmark and the City of Mesa will work together to strategically site a non-potable backup well to develop a well with production in the range of Desert Wells #13 and #16. Depending on the actual capacity of the future non-potable well, additional non-potable wells may be required of the developer to provide adequate flow during a dry-up period. For purposes of this report, the well design production is assumed to be 900 gpm for a conservative approach. This design production adequately supplies non-potable water for the modeled scenario with no drawdown in the Great Park lakes, as shown in Table 2.

4.0 HYDRAULIC MODEL

WaterCAD Version 8i by Haestad Methods was utilized to analyze the proposed non-potable water system. Pipes were sized to allow an approximate maximum flow velocity of around 5 fps to minimize head losses and water hammer within the distribution system. A hydraulic model was created to analyze the flow of non-potable water delivered through a shared non-potable waterline from the C.A.P. canal to both the future South C.A.P. Water Treatment Plant and Eastmark non-potable water system. For design purposes, a 48-inch diameter supply line is modeled. Actual diameter of this line may vary, and will be determined by the City.

The planned non-potable water gravity line from the C.A.P. canal to the future South C.A.P. Water Treatment Plant was modeled using information from the *City of Mesa Water Master Plan* regarding alignment and the water surface elevation in the canal. To approximate head losses in this line, a baseline flow of approximately 26,000 gallons per minute was modeled to simulate peak flow to the future South C.A.P. Water Treatment Plant. This flow was selected to achieve an approximate flow velocity in the 48-inch waterline of 5 fps. Refer to Plate 2 for locations of the non-potable waterlines.

The hydraulic modeling results indicate the system is capable of delivering flows to the Great Park lakes during normal operations with point-of-connection pressures of approximately 26 psi for the north lake, and 28 psi for the south lake. Pipe velocities are within acceptable ranges for modeled conditions of flow. Refer to Appendix B – *Full Build-Out Hydraulic Modeling Results* for additional information.

The Primary Interim Condition System hydraulic modeling results indicate the potable water system is capable of delivering flows to the first phase Great Park south lake during normal operations; with a point-of-connection pressure of approximately 90 psi for the north lake, and 88 for the south lake (refer to Appendix C – *Primary Interim Non-Potable Water Modeling Results*).

The Secondary Interim Condition System hydraulic modeling results indicate the non-potable backup well and temporary overland lake fill line is estimated to require approximately 30 psi or 69 feet of head above a natural ground elevation of 1,431 feet to deliver the water to the first and second phases of the Great Park lakes. During normal operations, the point-of-connection pressure is estimated to be approximately 23 psi at the north lake, and 25 psi at the south lake (refer to Appendix D – *Secondary Interim Non-Potable Water Modeling Results*).

4.1 Storage Lakes

The Great Park lakes are part of a City of Mesa regional public park and will provide storage for the Great Park irrigation systems.

4.2 Non-Potable Water Pump Station

4.2.1 Irrigation Pump Stations

The pump stations should be sized to provide peak irrigation flows with the largest pump out of service while maintaining required residual pressures. In addition, the pump station should include a series of pumps to accommodate phasing, seasonal variations in irrigation water demands, and low-flow conditions.

4.2.2 Filtration

Since surface water storage will be utilized, it is recommended that lake water be filtered at the pump stations with automatic backflush systems prior to entering the irrigation systems. The filters should be configured to remove particles large enough to clog the downstream irrigation system.

4.3 Non-Potable Water Piping

4.3.1 C.A.P. Non-Potable Water Transmission Main

As previously discussed, water from the C.A.P. canal may be conveyed to Eastmark through a shared delivery line supplying both the future South C.A.P. Water Treatment Plant and Eastmark non-potable water system.

4.3.2 Non-Potable Water Gravity Lake Fill Lines

The non-potable gravity lake fill waterlines will consist of 8-inch and 12-inch diameter pipes, and will be located within the Elliot Road and onsite road rights-of-way. The gravity lake fill waterlines will extend to the Great Park, as shown on Plate 2. The lake fill waterlines are sized to convey flows during the delivery windows described herein. Refer to Table 3 in Appendix A for pipe sizing calculations.

4.3.3 Valves

Resilient wedge gate valves are recommended for mains 12 inches in diameter and smaller. The recommended maximum valve spacing along the mains is one-quarter mile.

4.3.4 Separation from Water and Sewer Lines

Non-potable waterlines shall be treated as reclaimed waterlines for the purpose of maintaining minimum separation between water and sewer lines in accordance with Arizona Administrative Code Title 18, Chapter 9 Article 6. When a non-potable water main is adjacent to or crosses a potable water main, the non-potable water main shall be considered a pressure or force main sewer and comply with Maricopa Association of Governments (MAG) Standard Detail No. 404 for separation and/or protection. When a non-potable water main is adjacent to or crosses a gravity, pressure or force main sewer, the non-potable water main shall be considered a potable water main and comply with MAG Standard Detail 404 for separation and/or protection.

4.3.5 Depth of Cover

In addition to the separation described above, it is recommended that non-potable waterlines be installed at a depth below existing or planned water mains to minimize conflicts associated with service connections.

4.4 Non-Potable Water Well

The planned non-potable groundwater production well will be located near the northern portion of the Site. The actual location may vary. The well should be designed to pump into the dedicated 8-inch and 12-inch lake-fill lines, and convey non-potable water to the Great Park lakes. It is anticipated that the well would be used (with the exception of routine maintenance) as a backup supply in the event of a C.A.P. outage or dry-up as required to support the irrigation demands for the Great Park, and maintain adequate levels in the respective lakes as modeled in Table 2.

5.0 PLANNING CONSIDERATIONS

5.1 Irrigation Schedules

During normal operations, the irrigation systems will be supplied by the lakes and pump stations, allowing for flexible irrigation schedules. It is anticipated irrigation will occur during night time hours, as to not interfere with the facilities' daily activities.

5.2 Non-Potable Water Component Identification

Non-potable water components should be labeled, tagged or otherwise identified to indicate they convey non-potable water. These components include, but are not limited to distribution mains, transmission mains, valves, appurtenances and pump stations. Signage indicating irrigation water is non-potable should also be provided.

5.3 Non-Potable Water Meters

Non-potable water meters are recommended at the lake fill lines near the air-gap discharge points and at the non-potable well. Depending on the amount of suspended solids anticipated in the non-potable water system, turbo meters with strainers or magnetic-type (mag) meters may be required. These meters are suitable for use with non-potable water and can include radio-read features if required by the City.

5.4 System Controls and Operation

Eastmark will work with the City to design and construct a control system that provides the City the ability to monitor and control the non-potable water system in accordance with City and ADEQ requirements.

6.0 CONCLUSIONS

The *Master Non-Potable Water Report Update for Eastmark* meets accepted standards for non-potable water systems and serves as a guide for construction documents associated with the proposed system. No critical issues were identified. The following conclusions are provided:

1. Raw water delivered as C.A.P. water will be the primary source of non-potable water during the Full Build-Out Condition. The non-potable water will be conveyed to the Site through a gravity transmission waterline.

2. As part of the Primary Interim Condition System, potable water will be delivered to the first and second phases of the Great Park lakes through temporary dedicated connections to the potable water system until the City of Mesa non-potable backup well is constructed.

3. As part of the Secondary Interim Condition System, water from the non-potable groundwater production backup well will be delivered through a temporary overland waterline to the first and second phases of the non-potable system for the Great Park.

4. Two categories of landscaping have been identified, including low-water use and turf. Low-water use areas have a peak daily demand of 1,269 gallons per day per acre (gpd/acre) in the month of June, and turf areas have a peak daily demand of 9,480 gpd/acre in the month of October.

5. The Great Park lakes will provide storage and backup in the event of a C.A.P. outage or dry-up. The primary back-up water supply will be from the proposed City of Mesa non-potable backup well located within the Site.

6. As part of the Full Build-Out System Condition, the Great Park lakes will be filled from the planned non-potable water gravity transmission main. The Great Park will be irrigated by a public onsite system specifically designed for the Great Park.

7. The Full Build-Out Condition System will provide irrigation water supply within the defined design criteria throughout the non-potable water system, according to hydraulic modeling results.

8. This report demonstrates that the proposed non-potable water distribution system is adequate to serve the proposed Site as outlined in the table below:

PEAK DAY DEMAND SUMMARY

C.A.P. Canal in Service	**Phase 1 Great Park South Lake at 10 hours/day Fill Time**	**Phase 2 Great Park South Lake at 10 hours/day Fill Time**	**Total Peak Flow**
Peak Flow	283 gpm	733 gpm	1,016 gpm (1.46 MGD)*
C.A.P. Canal Outage/Dry-up	**Phase 1 Great Park South Lake at 24 hours/day Fill Time**	**Phase 2 Great Park North Lake at 24 hours/day Fill Time**	**Total Peak Flow**
Peak Flow	118 gpm	306 gpm	424 gpm (0.61 MGD)*

**Instantaneous flow rate is based on lake fill times. The total maximum daily demand is 0.61 MGD.*

APPENDIX A

Full Build-Out Non-Potable Water Calculations

Table 1: Non-Potable Water Use and Application Rates

Table 2: Non-Potable Water Calculations

Table 3: Non-Potable Water Lake Fill Line Sizing

Table 4: Water Demand Design Flows by Junction Node (Primary Interim Condition)

WOOD/PATEL **TABLE I - NON-POTABLE WATER USE AND APPLICATION RATES**

CIVIL ENGINEERS * HYDROLOGISTS * LAND SURVEYORS * CONSTRUCTION MANAGERS

Project: Eastmark
Location: Mesa, AZ
Date: April 17, 2014

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

Irrigation Requirements, Turf

	K_c	
Bermuda Grass (June-Oct)	0.80	*Source: Converting Reference Evapotranspiration into Turf Water Use, The University of Arizona*
Overseeded Rye Grass (Nov-May)	0.75	*Cooperative Extension, Turf Irrigation Management Series*

MONTH	ET_o[1] (in/month)	K_c[2] --	ET_T[3] (in/month)	Daily Demand (ac-ft/day/acre)	Daily Demand (gpd/acre)
January	2.38	0.75	1.79	0.0050	1,629
February	2.87	0.75	2.15	0.0060	1,955
March	4.66	0.75	3.50	0.0097	3,161
April	6.38	0.75	4.79	0.0133	4,334
May	8.71	0.75	6.53	0.0181	5,898
June	9.39	0.80	7.51	0.0209	6,810
July	9.02	0.80	7.22	0.0201	6,549
August	8.28	0.80	6.62	0.0184	5,995
September	6.60	0.80	5.28	0.0147	4,790
October	**13.09**	**0.80**	**10.47**	**0.0291**	**9,482**
November	2.75	0.75	2.06	0.0057	1,857
December	2.24	0.75	1.68	0.0047	1,531
Average:	**6.36**	**0.77**	**4.97**	**0.0138**	**4,499**

Notes:
1) ET_o=Historical Record of Reference Evapotranspiration, *Appendix J - Harvesting Rainwater for Landscape Use, Cooperative Extension, The University of Arizona*
2) K_c=Crop Coefficient, *Figure 2 and 4 of Converting Reference Evapotranspiration into Turf Water Use.*
3) ET_T=Actual Turf Water Use, $ET_T = ET_o \times K_c$
4) The October ET_o was adjusted for overseeding on the Great Park Turf areas.

Irrigation Requirements, Low-Water Use

	K_c	
Low-Water Use	0.25	*Source: Table 6 - Harvesting Rainwater for Landscape Use*
Percentage of Canopy Coverage (P)	60%	*Assumed Value*

MONTH	ET_o[5] (in/month)	K_c --	P --	ET_T[6] (in/month)	Demand (ac-ft/day/acre)	Demand (gpd/acre)
January	2.38	0.25	60%	0.36	0.0010	326
February	2.87	0.25	60%	0.43	0.0012	391
March	4.66	0.25	60%	0.70	0.0019	619
April	6.38	0.25	60%	0.96	0.0027	880
May	8.71	0.25	60%	1.31	0.0036	1,173
June	**9.39**	**0.25**	**60%**	**1.41**	**0.0039**	**1,271**
July	9.02	0.25	60%	1.35	0.0038	1,238
August	8.28	0.25	60%	1.24	0.0034	1,108
September	6.60	0.25	60%	0.99	0.0028	912
October	4.59	0.25	60%	0.69	0.0019	619
November	2.75	0.25	60%	0.41	0.0011	358
December	2.24	0.25	60%	0.34	0.0009	293
Average:	**5.66**			**0.85**	**0.0024**	**766**

Notes:
5) ET_o=Historical Record of Reference Evapotranspiration, *Appendix J - Harvesting Rainwater for Landscape Use, Cooperative Extension, The University of Arizona*
6) ET_T=Actual Turf Water Use, $ET_T = ET_o \times K_c \times P$

Lake Evaporation

Monthly Mean Lake Evaporation Rates

Month	(in/month)[7]	(gpd/acre)
January	2.42	2,190
February	3.22	2,914
March	4.89	4,426
April	6.91	6,254
May	9.06	8,200
June	10.14	9,178
July	**10.48**	**9,485**
August	9.50	8,598
September	7.75	7,014
October	5.45	4,933
November	3.32	3,005
December	2.37	2,145
Average	**6.29**	**5,695**

Adjustment Factor[8] = 0.80

Notes:
7) The Evaporation Rates are from The Western Regional Climate Center (Mesa Station).
8) The Adjustment Factor accounts for the difference between the pan evaporation measurement and shallow lake evaporation.

Average Annual Water Use

4.97	Acre-Ft Per Acre Turf
0.85	Acre-Ft Per Acre Low-Water Use
6.29	Acre-Ft Per Acre Lake Evaporation

WOOD/PATEL

TABLE 2 - NON-POTABLE WATER CALCULATIONS

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS • CONSTRUCTION MANAGERS

Project: Eastmark
Location: Mesa, AZ
Date: April 16, 2014

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

DESIGN PARAMETERS

Location	Value	Units	
Great Park South Turf Area (A):	15.0	acres	Assumes turf and is overseeded in October.
Great Park South Low Water Use Area (B):	17.0	acres	Actual Great Park land uses and programming may vary from the conceptual plan presented in this report. In the future, during final design the system will be designed to adequately serve the planned uses.
Great Park North Turf Area (C):	40.0	acres	Assumes turf and is overseeded in October.
Great Park North Low Water Use Area (D):	12.0	acres	Actual Great Park land uses and programming may vary from the conceptual plan presented in this report. In the future, during final design the system will be designed to adequately serve the planned uses.
Great Park South Lake Area (I):	1.0	acres	A 1-acre lake is modeled for design purposes. Actual lake size may vary and will be determined during final design.
Great Park North Lake Area (J):	3.0	acres	A 3-acre lake is modeled for design purposes. Actual lake size may vary and will be determined during final design.
Height of Vertical Lake Wall (M):	5.0	feet	
Horizontal Distance Between Lake Wall and 2:1 Sideslope (N):	8.0	feet	
Drawdown Period (O)	5.0	weeks	Modeled duration for turf overseeding period

CALCULATION ASSUMPTIONS

- Lakes were considered rectangular with a length to width ratio of 10:3.
- Lakes have a 5 foot vertical wall followed by an 8 ft horizontal shelf and 2:1 walls for the remaining lake depth.
- October was used as the worst case month due to overseeding of the park.
- A non-potable groundwater well will provide backup supply during C.A.P. dry-up.
- The backup well is assumed to have a pumping rate of 900 gpm and pumps 24 hours per day.

NON-POTABLE MONTHLY WATER USE

				WATER USE														
				Great Park South							Great Park North							
Month	Turf Daily Water Use[1] (P) (ac-ft/day/acre)	Low Water Use Daily Water Use[2] (Q) (ac-ft/day/acre)	Days/Month (R)	Turf Daily Water Use[3] (S) (ac-ft)	Low Water Use Daily Water Use[4] (T) (ac-ft)	Evap.[5] (U) (ac-ft)	Subtotal[6] (V) (ac-ft)	Contingency[7] 10% (W) (ac-ft)	Monthly Total[8] (X) (ac-ft)	Daily Total[9] (Y) (mgd)	Daily Park Lake Drawdown During Dry-up[10] (Z) (ft)	Turf Daily Water Use[11] (AA) (ac-ft)	Low Water Use Daily Water Use[12] (AB) (ac-ft)	Evap.[13] (AC) (ac-ft)	Subtotal[14] (AD) (ac-ft)	Contingency[15] 10% (AE) (ac-ft)	Monthly Total[16] (AF) (ac-ft)	Daily Total[17] (AG) (mgd)	Daily Park Lake Drawdown During Dry-up[18] (AH) (ft)
January	0.0050	0.0010	31	2.33	0.53	0.21	3.07	0.31	3.38	0.04	0.11	6.20	0.37	0.63	7.20	0.72	7.92	0.08	0.09
February	0.0060	0.0012	28	2.62	0.57	0.25	3.34	0.33	3.67	0.04	0.13	6.72	0.40	0.75	7.87	0.79	8.66	0.10	0.10
March	0.0097	0.0019	31	4.51	1.00	0.42	5.93	0.59	6.52	0.07	0.21	12.03	0.71	1.26	14.00	1.40	15.40	0.16	0.17
April	0.0133	0.0027	30	5.99	1.38	0.58	7.95	0.80	8.75	0.10	0.29	15.98	0.97	1.73	18.68	1.87	20.53	0.22	0.23
May	0.0161	0.0036	31	8.42	1.90	0.78	11.10	1.11	12.21	0.13	0.39	22.44	1.34	2.34	26.12	2.61	28.73	0.30	0.31
June	0.0209	0.0039	30	9.41	1.99	0.85	12.25	1.23	13.48	0.15	0.45	25.08	1.40	2.54	29.02	2.90	31.92	0.35	0.35
July	0.0201	0.0038	31	9.35	2.00	0.90	12.25	1.23	13.48	0.14	0.43	24.92	1.41	2.71	29.04	2.90	31.94	0.34	0.34
August	0.0184	0.0034	31	8.56	1.79	0.82	11.17	1.12	12.29	0.13	0.40	22.82	1.26	2.45	26.53	2.65	29.18	0.31	0.31
September	0.0147	0.0028	30	6.62	1.43	0.65	8.70	0.87	9.57	0.10	0.32	17.64	1.01	1.94	20.59	2.06	22.65	0.25	0.25
October	0.0291	0.0019	31	13.53	1.00	0.47	15.00	1.50	16.50	0.17	0.53	36.09	0.71	1.41	38.20	3.82	42.02	0.44	0.45
November	0.0057	0.0011	30	2.67	0.58	0.28	3.41	0.34	3.75	0.04	0.13	6.84	0.40	0.83	8.07	0.81	8.88	0.10	0.10
December	0.0047	0.0009	31	2.19	0.47	0.20	2.86	0.29	3.15	0.03	0.10	5.63	0.33	0.61	6.77	0.68	7.45	0.08	0.08
			ANNUAL TOTAL:	76.00	14.62	6.41	97.03	9.72	106.75			202.56	10.31	19.20	232.07	23.21	255.28		

	OVERALL WATER USE			
Month	Subtotal[19] (AQ) (ac-ft)	Contingency 10%[20] (AR) (ac-ft)	Total Monthly Water Use[21] (AS) (ac-ft)	Total Daily Water Use[22] (AT) (mgd)
January	10.27	1.03	11.30	0.12
February	11.21	1.12	12.33	0.14
March	19.93	1.99	21.92	0.23
April	26.61	2.66	29.27	0.32
May	37.22	3.72	40.94	0.43
June	41.27	4.13	45.40	0.49
July	41.29	4.13	45.42	0.48
August	37.70	3.77	41.47	0.44
September	29.29	2.93	32.22	0.35
October	53.20	5.32	58.52	0.62
November	11.48	1.15	12.63	0.14
December	9.53	0.96	10.59	0.11
	329.10	32.91	362.01	3.87

NON-POTABLE BACKUP WELL FOR PARK LAKE FILL AND DRAWDOWN CALCULATIONS DURING C.A.P. DRY-UP

	Non-Potable Backup Well Supply Calculations					Park Lakes Drawdown Calculations			
Month	Lake Fill Rate (gpm)	Backup Well Pumping Window (hours)	Monthly Lake Fill Volume[31] (AU) (ac-ft/month)	Daily Lake Fill Volume[32] (AV) (ac-ft/day)	Total Backup Volume Provided During C.A.P. Dry-up[33] (AW) (ac-ft)	Park Monthly Water Use During C.A.P. Dry-up[39] (AS) (ac-ft/month)	Park Daily Water Use During C.A.P. (ac-ft/day)	Total Volume Required for Drawdown Period[34] (AY) (ac-ft)	Lake Drawdown During C.A.P. Dry-up[36] (AZ)[37] (ft)
October	900	24	123.30	3.98	139.30	58.52	1.89	68.15	0.00

Notes:
1) Turf daily water use (P) per acre calculation shown on "non-potable water use and application rates" spreadsheet.
2) Low water use daily water use (Q) per acre calculation shown on "non-potable water use and application rates" spreadsheet.
3) S = A x P x R
4) T = B x Q x R
5) U = I x Daily Pan Evaporation Rate (From non-potable water use and application rates spreadsheet)(gpd/ac) x (R) / 7.48 (gal/ft3) / 43,560 (ft2/ac)
6) V = S + T + U
7) W = V x 10%
8) X = V + W
9) Y =((X / R)*(43,560 sq. ft/ac)*(7.48 gal/cu. ft.))/1,000,000 gal
10) Z = (X / R) / I
11) AA = C x P x R
12) AB = D x Q x R
13) AC = J x Daily Pan Evaporation Rate (From non-potable water use and application rates spreadsheet)(gpd/ac) x (R) / 7.48 (gal/ft3) / 43,560 (ft2/ac)
14) AD = AA + AB + AC
15) AE = AD x 10%
16) AF = AD + AE
17) AG =((AF / R)*(43,560 sq. ft/ac)*(7.48 gal/cu. ft.))/1,000,000 gal
18) AH = (AF / R) / J
19) AQ = V + AD
20) AR = AQ x 10%
21) AS = AQ + AR
22) AT = ((AS/R)*(43,560 sq. ft/ac)*(7.48 gal/cu. ft.))/1,000,000 gal

31) AU = (R x 24 hrs/day x 60 min/hr x 900 gallons/min) / (7.48 gallons/ft³) / (43,560 ft²/acre)
32) AV = AU / R
33) AW = AV x O x 7 days/week
34) AX = AS / R
35) AY = AX x O x 7 days/week
36) AZ = (AY - AW) / (I + J) Represents total lake drawdown over the 5-week October overseeding period for the well pumping rate shown.
37) Since the total volume required for the drawdown period is less than the total backup volume provided; no drawdown will occur during the C.A.P. Dry-up.

WOOD/PATEL

TABLE 3 - NON-POTABLE WATER LAKE FILL LINE SIZING

CIVIL ENGINEERS * HYDROLOGISTS * LAND SURVEYORS * CONSTRUCTION MANAGERS

Project: Eastmark
Location: Mesa, AZ
Date: April 17, 2014

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

Peak Daily Impact to CAP Gravity Line, October

Description	Great Park South	Great Park North	Peak Daily Flow (mgd)*	Notes
Average Day Demand (gpd)	170,000	440,000	0.61	<=Daily Flow Withdrawn from CAP Canal for Eastmark

*Flow rate includes 10% contingency.

Lake Fill Line Delivery Rates

Description	South Great Park Lake	North Great Park Lake	Peak Instantaneous Flow gpm	Peak Instantaneous Flow mgd	Notes
Delivery Window (hrs):	10	10			
Peak Delivery Rate (gpm):	283	733	1,016	1.46	<=Peak flow through CAP Gravity Line for Eastmark

Lake Fill Line Segment 2: Supply Line to Potential Future North Great Park Lake

Description	Value	Units	Notes
Peak Delivery Rate (gpm):	1,016	gpm	10-hour delivery of non-potable water to North Great Park Lake.
Peak Delivery Rate (cfs):	2.26	cfs	
Fill Line Nominal Diameter, CAP Gravity Line to North Great Park Lake:	12	in	<=Nominal Fill Line Pipe Diameter
Fill Line Velocity:	2.88	ft/s	

Lake Fill Line Segment 3: Downstream of North Great Park Lake to South Great Park Lake

Description	Value	Units	Notes
Peak Delivery Rate (gpm):	283	gpm	10-hour delivery of non-potable water to South Great Park Lake.
Peak Delivery Rate (cfs):	0.63	cfs	
Fill Line Nominal Diameter, CAP Gravity Line to North Great Park Lake:	12	in	<=Nominal Fill Line Pipe Diameter
Fill Line Velocity:	0.80	ft/s	

WOOD/PATEL **TABLE 4 - WATER DEMAND DESIGN FLOWS BY JUNCTION NODE (PRIMARY INTERIM CONDITION)**

CIVIL ENGINEERS * HYDROLOGISTS * LAND SURVEYORS * CONSTRUCTION MANAGERS

Project: Eastmark
Location: Mesa, Arizona
References: 2012 City of Mesa Engineering Design Standards

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

HYDRAULIC MODEL NODE	WATER DEMAND (GPM)	
	AVE. DAY	MAX DAY
J-DU3S-010	10.2	20.4
J-DU3S-020	11.0	22.0
J-DU3S-030	15.0	30.0
J-DU3S-040	11.0	22.0
J-DU3S-050	12.1	24.2
J-DU3S-060	11.8	23.6
J-DU3S-070	7.0	14.0
J-DU3S-080	53.9	107.8
J-DU3-4-010	138.1	276.2
J-DU3-4-020	138.1	276.2
J-DU3-4-030	129.6	259.2
J-DU3-4-040	151.3	302.6
J-DU3-4-050	25.6	51.2
J-DU3-4-060	58.9	117.8
J-DU3-4-070	186.6	373.2
J-DU3-4-080	186.6	373.2
J-DU3-4-090	75.7	151.4
J-DU3-4-100	186.1	372.2
J-DU3-4-110	141.1	282.2
J-DU3-4-120	156.1	312.2
J-DU3-4-130	174.5	349.0
J-DU3-4-140	93.2	186.4
J-DU3-4-150	70.6	141.2
J-DU3-4-160	0.0	0.0
J-DU3-4-170	0.0	0.0
J-DU3-4-180	7.4	14.8
J-DU3-4-190	32.9	65.8
J-DU3-4-200	138.1	276.2
J-DU5E-010	175.0	350.0
JDU5E-020	175.0	350.0
J-DU6-010	0.0	0.0
J-DU6-020 [1]	1580.0	2196.2
J-DU6-030	80.3	160.6
J-DU6-040	160.7	321.4
J-DU6-050	241.0	482.0
J-DU6-060 [1]	360.0	500.4
J-DU6-070	80.3	160.6
J-DU6-080	80.3	160.6
J-DU6-090	80.3	160.6
J-DU7-010	6.5	13.0
J-DU7-020	227.6	455.2
J-DU7-030	0.0	0.0
J-DU7-040	25.6	51.2
J-DU7-050 [2]	358.0	410.5
J-DU7-060	11.1	22.2
J-DU7-070	0.0	0.0
J-DU7-080	35.0	70.0
J-DU7-090	0.0	0.0
J-DU7-100	28.9	57.8
J-DU7-110	28.8	57.6
J-DU7-120	0.0	0.0
J-DU7-130 [2]	120.6	123.2
J-DU7-140	49.9	99.8
J-DU7-150	16.3	32.6
J-DU7-160	24.0	48.0
J-DU7-170	10.7	21.4
J-DU7-180	18.7	37.4
J-DU7-190	30.1	60.2
J-DU7-200	50.7	101.4
J-250EX	39.5	79.0
J-DU8-010	0.0	0.0
J-DU8-020	0.0	0.0
J-DU8-030	0.0	0.0

J-DU8-040	6.7	13.4
J-DU8-050	0.0	0.0
J-DU8-060	9.1	18.2
J-DU8-070	15.4	30.8
J-DU8-080	4.4	8.8
J-DU8-090	11.0	22.0
J-DU8-100	9.1	18.2
J-DU8-110	43.6	87.2
J-DU8-120	17.2	34.4
J-DU8-130	21.0	42.0
J-DU9-010	19.7	39.4
J-DU9-020	36.5	73.0
J-DU9-030	33.3	66.6
J-DU9-040	7.8	15.6
J-DU9-050	0.0	0.0
J-DU9-060	31.4	62.8
J-DU9-070	31.7	63.4
J-DU9-080	38.6	77.2
J-300EX	53.9	107.8
J-1130EX	175.0	350.0
J-2340EX	175.0	350.0
TOTAL	**7,057.8**	**12,508.7**

Notes: 1) The CH2M Hill Plan that was provided by the City of Mesa shows that the Max Day Demand and Peak Hour Demand is equal to approximately 1.39 multiplied by the AVG Day Demand.

2) The Max Day Demand for the Great Park when supplied over 10 hours is 283 GPM (South) and 733 GPM (North). During the Interim condition, this demand was adjusted to be supplied over 24 hours. Thus, the Max Day demand for the park is 118 GPM (South) and 305.6 GPM (North).

APPENDIX B

Full Build-Out Hydraulic Modeling Results

FlexTable: Reservoir Table

Active Scenario: Shared C.A.P. Supply Line

Current Time: 0.000 hours

Label	Elevation (ft)	Flow Net (Out) (gpm)	Hydraulic Grade (ft)
C.A.P. Canal	1,553.00	27,016	1,553.00

FlexTable: Junction Table

Active Scenario: Shared C.A.P. Supply Line

Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-100	1,480.00	0	23.7	1,534.86
J-200	1,438.00	0	33.5	1,515.35
J-300	1,480.00	26,000	23.0	1,533.18
J-301	1,420.00	0	28.7	1,486.35
J-303	1,415.00	0	31.3	1,487.24
PARK LAKE N	1,408.00	733	26.2	1,468.58
PARK LAKE S	1,420.00	283	27.9	1,484.46

FlexTable: Pipe Table

Active Scenario: Shared C.A.P. Supply Line

Current Time: 0.000 hours

Label	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/1000ft)
P-100	48.0	13,461.00	130.0	27,016	4.79	18.14	1.347
P-200	12.0	7,437.00	130.0	1,016	2.88	19.52	2.624
P-600	48.0	1,362.00	130.0	26,000	4.61	1.68	1.235
P-602	8.0	1,072.00	130.0	283	1.81	1.89	1.763
P-604	12.0	10,769.00	130.0	1,016	2.88	28.11	2.610
P-605	12.0	3,615.00	130.0	283	0.80	0.88	0.245
P-606	8.0	1,816.00	130.0	733	4.68	18.66	10.276

APPENDIX C

Primary Interim Non-Potable Water Modeling Results

Active Scenario: Max Day Demand - Served by SCAP
FlexTable: Reservoir Table
(144173_EM NPW_OP1_4-17-14.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Flow Net (Out) (gpm)	Hydraulic Grade (ft)
C.O.M. DW SUPPLY FROM NORTH	1,634.0	1,458.8	1,634.0
SCAP DWPS	1,634.0	11,050.0	1,634.0
DWGWF - DWPS	1,634.0	(N/A)	(N/A)

Active Scenario: Max Day Demand - Served by SCAP
FlexTable: Junction Table
(144173_EM NPW_OP1_4-17-14.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-100EX	1,406.0	0.0	94	1,623.2
J-110EX	1,440.0	0.0	80	1,623.9
J-120EX	1,462.0	0.0	74	1,631.9
J-135EX	1,460.0	0.0	73	1,629.8
J-150EX	1,472.0	0.0	67	1,627.4
J-160EX	1,435.0	0.0	82	1,625.3
J-170EX	1,430.0	0.0	84	1,624.9
J-180EX	1,410.0	0.0	93	1,624.3
J-190EX	1,395.0	0.0	99	1,623.6
J-200EX	1,385.0	0.0	103	1,622.9
J-220EX	1,480.0	0.0	65	1,629.7
J-230EX	1,475.0	0.0	66	1,628.3
J-250EX	1,452.0	79.0	76	1,627.4
J-260EX	1,453.0	0.0	75	1,627.4
J-270	1,429.0	0.0	85	1,626.2
J-280EX	1,460.0	0.0	72	1,626.0
J-300EX	1,392.0	107.8	100	1,622.3
J-330EX	1,455.0	0.0	74	1,626.7
J-340	1,440.0	0.0	81	1,626.3
J-360EX	1,400.0	0.0	96	1,622.4
J-550	1,425.0	0.0	87	1,626.2
J-590EX	1,410.0	0.0	92	1,623.5
J-920	1,434.0	0.0	83	1,626.4
J-950	1,414.0	0.0	90	1,623.2
J-960EX	1,401.0	0.0	96	1,622.7
J-970EX	1,397.0	0.0	97	1,622.2
J-1000EX	1,455.0	0.0	77	1,633.5
J-1010EX	1,485.0	0.0	64	1,633.0
J-1020EX	1,425.0	0.0	90	1,633.8
J-1030EX	1,480.0	0.0	67	1,634.0
J-1040EX	1,433.0	0.0	83	1,624.6
J-1050EX	1,445.0	0.0	79	1,626.9
J-1120EX	1,453.0	0.0	75	1,627.4
J-1130EX	1,445.0	350.0	78	1,626.2
J-1160EX	1,445.0	0.0	82	1,633.5
J-1170EX	1,470.0	0.0	71	1,633.2
J-1180EX	1,440.0	0.0	84	1,633.6
J-1190EX	1,420.0	0.0	92	1,633.8
J-1200EX	1,445.0	0.0	82	1,633.6
J-1210EX	1,455.0	0.0	77	1,633.2
J-1220EX	1,475.0	0.0	68	1,632.5
J-1230EX	1,460.0	0.0	72	1,626.3
J-1235EX	1,440.0	0.0	81	1,626.7
J-1240EX	1,455.0	0.0	74	1,626.9

Active Scenario: Max Day Demand - Served by SCAP
FlexTable: Junction Table
(144173_EM NPW_OP1_4-17-14.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-1290EX	1,480.0	0.0	66	1,632.6
J-1300EX	1,465.0	0.0	73	1,633.2
J-1310EX	1,480.0	0.0	66	1,632.7
J-1330EX	1,465.0	0.0	73	1,633.2
J-1340EX	1,450.0	0.0	79	1,633.5
J-1350EX	1,465.0	0.0	73	1,633.2
J-1360EX	1,445.0	0.0	82	1,633.5
J-1370EX	1,430.0	0.0	88	1,633.6
J-1380EX	1,450.0	0.0	79	1,633.6
J-1390EX	1,430.0	0.0	88	1,633.6
J-1400EX	1,430.0	0.0	88	1,633.6
J-1410	1,454.0	0.0	75	1,628.1
J-1410EX	1,420.0	0.0	92	1,633.8
J-1420EX	1,460.0	0.0	73	1,627.7
J-1430EX	1,455.0	0.0	75	1,628.1
J-1440EX	1,478.0	0.0	65	1,628.9
J-1680EX	1,400.0	0.0	96	1,622.6
J-1990EX	1,447.0	0.0	78	1,627.0
J-2000EX	1,442.0	0.0	80	1,626.7
J-2120EX	1,453.0	0.0	75	1,626.5
J-2140EX	1,446.0	0.0	78	1,626.2
J-2295	1,415.0	0.0	90	1,623.1
J-2340EX	1,435.0	350.0	82	1,624.9
J-DU3-4-010	1,405.0	276.2	94	1,622.3
J-DU3-4-020	1,401.0	276.2	96	1,622.3
J-DU3-4-030	1,397.0	259.2	97	1,622.2
J-DU3-4-040	1,403.0	302.6	95	1,622.3
J-DU3-4-050	1,410.0	51.2	92	1,622.1
J-DU3-4-060	1,408.0	117.8	92	1,621.6
J-DU3-4-070	1,404.0	373.2	94	1,621.2
J-DU3-4-080	1,400.0	373.2	96	1,621.2
J-DU3-4-090	1,393.0	151.4	99	1,621.6
J-DU3-4-100	1,391.0	372.2	100	1,622.1
J-DU3-4-110	1,393.0	282.2	99	1,621.6
J-DU3-4-120	1,393.0	312.2	99	1,621.7
J-DU3-4-130	1,399.0	349.0	96	1,621.6
J-DU3-4-140	1,404.0	186.4	94	1,621.7
J-DU3-4-150	1,407.0	141.2	93	1,621.6
J-DU3-4-160	1,407.0	0.0	93	1,621.9
J-DU3-4-170	1,412.0	0.0	91	1,622.2
J-DU3-4-180	1,414.0	14.8	90	1,622.5
J-DU3-4-190	1,417.0	65.8	89	1,622.7
J-DU3-4-200	1,412.5	276.2	91	1,622.5
J-DU3S-010	1,412.0	20.4	91	1,622.8

Active Scenario: Max Day Demand - Served by SCAP

FlexTable: Junction Table

(144173_EM NPW_OP1_4-17-14.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-DU3S-020	1,407.0	22.0	93	1,622.5
J-DU3S-030	1,401.0	30.0	96	1,622.3
J-DU3S-040	1,399.0	22.0	97	1,622.3
J-DU3S-050	1,404.0	24.2	94	1,622.3
J-DU3S-060	1,410.0	23.6	92	1,622.5
J-DU3S-070	1,417.0	14.0	89	1,622.7
J-DU3S-080	1,396.0	107.8	98	1,622.3
J-DU5E-010	1,435.0	350.0	82	1,624.5
J-DU5E-020	1,440.0	350.0	80	1,624.6
J-DU6-010	1,459.0	0.0	73	1,626.7
J-DU6-020	1,453.0	2,196.2	75	1,626.4
J-DU6-030	1,450.0	160.6	76	1,626.2
J-DU6-040	1,440.0	321.4	81	1,626.2
J-DU6-050	1,448.0	482.0	77	1,626.4
J-DU6-060	1,458.0	500.4	73	1,627.5
J-DU6-070	1,452.0	160.6	76	1,627.3
J-DU6-080	1,446.0	160.6	78	1,626.4
J-DU6-090	1,435.0	160.6	83	1,626.2
J-DU7-010	1,415.0	13.0	90	1,623.0
J-DU7-020	1,425.0	455.2	85	1,622.5
J-DU7-030	1,416.0	0.0	89	1,622.5
J-DU7-040	1,409.0	51.2	92	1,622.6
J-DU7-050	1,416.0	410.6	90	1,623.2
J-DU7-060	1,423.0	22.2	87	1,623.9
J-DU7-070	1,430.0	0.0	84	1,624.7
J-DU7-080	1,434.0	70.0	83	1,625.4
J-DU7-090	1,437.0	0.0	82	1,626.7
J-DU7-100	1,435.0	57.8	83	1,625.8
J-DU7-110	1,435.0	57.6	82	1,624.4
J-DU7-120	1,420.0	0.0	88	1,623.4
J-DU7-130	1,420.0	123.2	88	1,623.3
J-DU7-140	1,425.0	99.8	86	1,623.3
J-DU7-150	1,419.0	32.6	88	1,623.2
J-DU7-160	1,435.0	48.0	82	1,624.6
J-DU7-170	1,432.0	21.4	83	1,624.6
J-DU7-180	1,433.0	37.4	83	1,624.7
J-DU7-190	1,437.0	60.2	82	1,625.6
J-DU7-200	1,432.0	101.4	83	1,623.6
J-DU8-010	1,420.0	0.0	88	1,623.4
J-DU8-020	1,419.5	0.0	88	1,623.7
J-DU8-030	1,421.0	0.0	88	1,624.2
J-DU8-040	1,418.0	13.4	89	1,624.8
J-DU8-050	1,422.0	0.0	88	1,625.1
J-DU8-060	1,420.0	18.2	88	1,624.0

Active Scenario: Max Day Demand - Served by SCAP

FlexTable: Junction Table

(144173_EM NPW_OP1_4-17-14.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-DU8-070	1,420.0	30.8	88	1,624.0
J-DU8-080	1,422.0	8.8	87	1,624.2
J-DU8-090	1,424.0	22.0	87	1,624.2
J-DU8-100	1,425.0	18.2	86	1,624.3
J-DU8-110	1,430.0	87.2	84	1,624.2
J-DU8-120	1,431.0	34.4	84	1,624.2
J-DU8-130	1,427.0	42.0	85	1,624.3
J-DU9-010	1,419.0	39.4	88	1,623.4
J-DU9-020	1,415.0	73.0	90	1,623.6
J-DU9-030	1,416.0	66.6	90	1,623.8
J-DU9-040	1,416.0	15.6	90	1,623.8
J-DU9-050	1,419.0	0.0	89	1,623.9
J-DU9-060	1,422.0	62.8	88	1,624.4
J-DU9-070	1,414.0	63.4	91	1,623.8
J-DU9-080	1,419.0	77.2	89	1,623.8

Active Scenario: Max Day Demand - Served by SCAP

FlexTable: Pipe Table

(144173_EM NPW_OP1_4-17-14.wtg)

Current Time: 0.000 hours

Label	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/1000ft)
P-160EX	16.0	2,722.00	120.0	383.3	0.61	0.33	0.123
P-170EX	16.0	5,366.00	120.0	383.3	0.61	0.66	0.123
P-180EX	16.0	5,396.00	120.0	383.3	0.61	0.66	0.123
P-190EX	16.0	5,728.00	120.0	383.3	0.61	0.70	0.123
P-200EX	16.0	231.00	120.0	-363.2	0.58	0.03	0.111
P-210EX	16.0	1,388.00	120.0	-454.7	0.73	0.23	0.168
P-220EX	16.0	2,909.00	120.0	1,018.4	1.62	2.18	0.749
P-240EX	16.0	1,387.00	120.0	-2,489.0	3.97	5.44	3.919
P-250EX	16.0	2,611.00	120.0	636.2	1.02	0.82	0.313
P-310	30.0	4,937.00	120.0	2,203.2	1.00	0.72	0.146
P-340EX	16.0	5,775.00	120.0	383.3	0.61	0.71	0.123
P-410EX	16.0	5,368.00	120.0	383.3	0.61	0.66	0.123
P-970	24.0	1,001.00	120.0	1,183.8	0.84	0.14	0.137
P-980	24.0	1,935.00	120.0	0.0	0.00	0.00	0.000
P-1060EX	16.0	1,328.00	120.0	-598.3	0.95	0.37	0.280
P-1070EX	16.0	1,243.00	120.0	-598.3	0.95	0.35	0.280
P-1630EX	16.0	1,793.00	120.0	325.4	0.52	0.16	0.091
P-1640EX	16.0	1,335.00	120.0	667.2	1.06	0.46	0.342
P-1780	24.0	1,528.00	120.0	1,183.8	0.84	0.21	0.137
P-1790	24.0	1,115.00	120.0	1,183.8	0.84	0.15	0.137
P-1940EX	16.0	1,976.00	120.0	-598.3	0.95	0.55	0.280
P-1950EX	16.0	680.00	120.0	-598.3	0.95	0.19	0.280
P-1970EX	16.0	927.00	120.0	113.5	0.18	0.01	0.013
P-1980EX	16.0	1,106.00	120.0	-168.7	0.27	0.03	0.027
P-2000EX	16.0	2,710.00	120.0	-598.3	0.95	0.76	0.280
P-2040EX	16.0	10,635.00	120.0	-339.9	0.54	1.04	0.098
P-2055EX	16.0	10,453.00	120.0	153.1	0.24	0.23	0.022
P-2070EX	24.0	5,329.00	120.0	-965.9	0.69	0.50	0.094
P-2500EX	24.0	2,750.00	120.0	1,012.3	0.72	0.28	0.103
P-2510EX	24.0	2,726.00	120.0	969.8	0.69	0.26	0.095
P-2540EX	12.0	2,624.00	120.0	-119.4	0.34	0.15	0.057
P-2570EX	16.0	2,640.00	120.0	0.0	0.00	0.00	0.000
P-2655EX	16.0	2,870.00	120.0	383.3	0.61	0.35	0.123
P-2660EX	24.0	2,797.00	120.0	1,458.8	1.03	0.57	0.202
P-2665EX	16.0	2,716.00	120.0	383.3	0.61	0.33	0.123
P-2690EX	16.0	2,914.00	120.0	-154.0	0.25	0.07	0.023
P-2700EX	16.0	3,115.00	120.0	482.2	0.77	0.58	0.188
P-2710EX	16.0	1,823.00	120.0	366.1	0.58	0.21	0.113
P-2720EX	12.0	3,042.00	120.0	-116.1	0.33	0.17	0.054
P-2830	16.0	2,890.00	120.0	-17.2	0.03	0.00	0.000
P-2860EX	24.0	761.00	120.0	1,458.8	1.03	0.15	0.202
P-2880EX	12.0	383.00	120.0	0.0	0.00	0.00	0.000
P-2890EX	8.0	3,148.00	120.0	-75.0	0.48	0.55	0.175
P-2900	24.0	1,423.00	120.0	1,309.7	0.93	0.24	0.166

Active Scenario: Max Day Demand - Served by SCAP

FlexTable: Pipe Table

(144173_EM NPW_OP1_4-17-14.wtg)

Current Time: 0.000 hours

Label	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/1000ft)
P-2910EX	24.0	497.00	120.0	1,383.8	0.98	0.09	0.183
P-2950	12.0	1,089.00	120.0	42.5	0.12	0.01	0.008
P-2970EX	12.0	1,119.00	120.0	70.4	0.20	0.02	0.021
P-2990EX	8.0	2,811.00	120.0	-54.0	0.34	0.27	0.095
P-3010EX	12.0	471.00	120.0	75.0	0.21	0.01	0.024
P-3020EX	12.0	1,167.00	120.0	16.3	0.05	0.00	0.001
P-3030EX	12.0	378.00	120.0	0.0	0.00	0.00	0.000
P-3040EX	8.0	3,081.00	120.0	-52.6	0.34	0.28	0.091
P-3060	12.0	595.00	120.0	0.0	0.00	0.00	0.000
P-3070EX	8.0	2,922.00	120.0	-36.3	0.23	0.13	0.046
P-3080EX	12.0	1,397.00	120.0	-116.8	0.33	0.08	0.055
P-3090EX	12.0	1,109.00	120.0	-93.2	0.26	0.04	0.036
P-3100EX	12.0	695.00	120.0	26.2	0.07	0.00	0.004
P-3110EX	12.0	664.00	120.0	2.6	0.01	0.00	0.000
P-3120EX	8.0	1,851.00	120.0	-23.5	0.15	0.04	0.020
P-3130	12.0	1,155.00	120.0	36.3	0.10	0.01	0.006
P-3140EX	16.0	1,783.00	120.0	33.7	0.05	0.00	0.001
P-3150EX	16.0	958.00	120.0	0.0	0.00	0.00	0.000
P-3160EX	8.0	3,801.00	120.0	-33.7	0.21	0.15	0.040
P-3170EX	8.0	2,838.00	120.0	-74.1	0.47	0.49	0.171
P-3180EX	8.0	736.00	120.0	22.4	0.14	0.01	0.019
P-3190EX	30.0	4,441.00	120.0	5,739.6	2.61	3.83	0.862
P-3200	30.0	814.00	120.0	5,739.6	2.61	0.70	0.862
P-3240EX	16.0	1,954.00	120.0	466.4	0.74	0.34	0.176
P-3250EX	12.0	844.00	120.0	-382.2	1.08	0.42	0.495
P-3260EX	16.0	1,108.00	120.0	1,018.4	1.62	0.83	0.749
P-3270EX	16.0	1,509.00	120.0	747.1	1.19	0.64	0.422
P-3280EX	12.0	2,890.00	120.0	-271.3	0.77	0.76	0.262
P-3290EX	12.0	2,432.00	120.0	110.9	0.31	0.12	0.050
P-3930EX	16.0	751.00	120.0	-598.3	0.95	0.21	0.280
P-3940EX	16.0	509.00	120.0	-598.3	0.95	0.14	0.280
P-3970EX	16.0	1,445.00	120.0	598.3	0.95	0.40	0.280
P-4720EX	16.0	1,216.00	120.0	605.8	0.97	0.35	0.286
P-4730EX	16.0	456.00	120.0	605.8	0.97	0.13	0.286
P-4750EX	16.0	715.00	120.0	605.8	0.97	0.20	0.286
P-4760EX	16.0	774.00	120.0	32.0	0.05	0.00	0.001
P-4790EX	16.0	1,816.00	120.0	148.2	0.24	0.04	0.021
P-5700EX	16.0	1,176.00	120.0	1,626.7	2.60	2.10	1.783
P-5710EX	16.0	1,171.00	120.0	1,626.7	2.60	2.09	1.783
P-5770	16.0	353.00	120.0	-7.7	0.01	0.00	0.000
P-5780	16.0	684.00	120.0	-7.7	0.01	0.00	0.000
P-6030	12.0	162.00	120.0	-91.6	0.26	0.01	0.035
P-6070	16.0	247.00	120.0	-538.4	0.86	0.06	0.230
P-6166	16.0	900.00	120.0	-598.3	0.95	0.25	0.280

Active Scenario: Max Day Demand - Served by SCAP
FlexTable: Pipe Table
(144173_EM NPW_OP1_4-17-14.wtg)

Current Time: 0.000 hours

Label	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/1000ft)
P-6167EX	16.0	1,381.00	120.0	-1,169.5	1.87	1.34	0.967
P-6171	16.0	3,164.00	120.0	1,635.1	2.61	5.69	1.800
P-7000	16.0	742.00	120.0	-342.5	0.55	0.07	0.100
P-COMWTREX	36.0	10.00	120.0	1,458.8	0.46	0.00	0.024
P-DU-3-4-070	12.0	734.00	120.0	-455.0	1.29	0.50	0.684
P-DU-3-4-080	12.0	913.00	120.0	-344.1	0.98	0.37	0.408
P-DU-3-4-090	12.0	1,401.00	120.0	29.1	0.08	0.01	0.004
P-DU-3-4-100	12.0	717.00	120.0	-402.3	1.14	0.39	0.544
P-DU-3-4-110	16.0	597.00	120.0	117.4	0.19	0.01	0.014
P-DU-3-4-120	16.0	1,375.00	120.0	-231.6	0.37	0.07	0.048
P-DU-3-4-130	12.0	1,165.00	120.0	148.1	0.42	0.10	0.086
P-DU-3S-130	16.0	1,385.00	120.0	-705.1	1.13	0.52	0.379
P-DU3-4-010	12.0	1,834.00	120.0	-34.6	0.10	0.01	0.006
P-DU3-4-020	24.0	1,370.00	120.0	-714.0	0.51	0.07	0.054
P-DU3-4-030	24.0	1,035.00	120.0	-973.2	0.69	0.10	0.096
P-DU3-4-040	24.0	496.00	120.0	-1,214.8	0.86	0.07	0.144
P-DU3-4-050	24.0	1,092.00	120.0	-1,517.4	1.08	0.24	0.217
P-DU3-4-060	12.0	553.00	120.0	-506.2	1.44	0.46	0.833
P-DU3-4-160	12.0	1,157.00	120.0	6.9	0.02	0.00	0.000
P-DU3-4-170	16.0	937.00	120.0	-566.1	0.90	0.24	0.252
P-DU3-4-180	16.0	1,045.00	120.0	-566.1	0.90	0.26	0.252
P-DU3-4-190	16.0	1,019.00	120.0	-566.1	0.90	0.26	0.252
P-DU3-4-200	16.0	958.00	120.0	-580.9	0.93	0.25	0.265
P-DU3-4-210	16.0	1,373.00	120.0	-646.7	1.03	0.44	0.323
P-DU3S-010	8.0	261.00	120.0	195.8	1.25	0.27	1.034
P-DU3S-020	8.0	1,374.00	120.0	84.6	0.54	0.30	0.219
P-DU3S-030	8.0	1,542.00	120.0	62.6	0.40	0.19	0.125
P-DU3S-040	8.0	1,242.00	120.0	32.6	0.21	0.05	0.037
P-DU3S-050	8.0	801.00	120.0	-39.6	0.25	0.04	0.054
P-DU3S-060	8.0	974.00	120.0	-29.0	0.19	0.03	0.030
P-DU3S-070	8.0	1,384.00	120.0	-53.2	0.34	0.13	0.093
P-DU3S-080	8.0	1,241.00	120.0	-76.8	0.49	0.23	0.183
P-DU3S-090	8.0	621.00	120.0	-90.8	0.58	0.15	0.249
P-DU3S-100	16.0	1,114.00	130.0	49.9	0.08	0.00	0.002
P-DU3S-110	16.0	1,525.00	130.0	-118.1	0.19	0.02	0.012
P-DU3S-120	16.0	1,560.00	120.0	-428.9	0.68	0.24	0.151
P-DU5E-010	12.0	2,201.00	120.0	-221.1	0.63	0.40	0.180
P-DU5E-020	12.0	1,392.00	120.0	128.9	0.37	0.09	0.066
P-DU5E-030	12.0	2,181.00	120.0	478.9	1.36	1.64	0.752
P-DU6-010	12.0	1,163.00	120.0	311.1	0.88	0.39	0.338
P-DU6-020	16.0	124.00	120.0	1,162.1	1.85	0.12	0.956
P-DU6-030	12.0	1,388.00	120.0	149.4	0.42	0.12	0.087
P-DU6-040	12.0	2,188.00	120.0	-80.3	0.23	0.06	0.028
P-DU6-050	12.0	2,203.00	120.0	-0.2	0.00	0.00	0.000

Active Scenario: Max Day Demand - Served by SCAP

FlexTable: Pipe Table

(144173_EM NPW_OP1_4-17-14.wtg)

Current Time: 0.000 hours

Label	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/1000ft)
P-DU6-060	12.0	2,209.00	120.0	311.1	0.88	0.75	0.338
P-DU6-070	16.0	142.00	120.0	1,542.5	2.46	0.23	1.615
P-DU6-080	12.0	1,130.00	120.0	561.5	1.59	1.14	1.009
P-DU6-090	12.0	1,397.00	120.0	185.3	0.53	0.18	0.129
P-DU6-100	12.0	1,966.00	120.0	55.8	0.16	0.03	0.014
P-DU6-110	12.0	1,963.00	120.0	-106.0	0.30	0.09	0.046
P-DU6-120	12.0	1,955.00	120.0	-169.5	0.48	0.21	0.110
P-DU6-130	12.0	135.00	120.0	474.1	1.34	0.10	0.738
P-DU6-140	12.0	1,094.00	120.0	483.0	1.37	0.84	0.764
P-DU6-150	12.0	1,411.00	120.0	216.4	0.61	0.24	0.173
P-DU6-160	16.0	211.00	120.0	872.1	1.39	0.12	0.562
P-DU7-010	12.0	1,169.00	120.0	365.8	1.04	0.53	0.457
P-DU7-020	12.0	1,092.00	120.0	89.4	0.25	0.04	0.034
P-DU7-030	12.0	1,044.00	120.0	89.4	0.25	0.04	0.034
P-DU7-040	24.0	1,410.00	120.0	-2,164.2	1.53	0.59	0.420
P-DU7-050	24.0	1,075.00	120.0	-2,745.0	1.95	0.70	0.652
P-DU7-060	24.0	1,254.00	120.0	-2,767.2	1.96	0.83	0.662
P-DU7-070	24.0	992.00	120.0	-2,927.8	2.08	0.73	0.735
P-DU7-080	24.0	2,552.00	120.0	-2,997.8	2.13	1.96	0.767
P-DU7-090	16.0	941.00	120.0	-1,150.4	1.84	0.88	0.938
P-DU7-100	16.0	1,562.00	120.0	-1,092.6	1.74	1.33	0.853
P-DU7-110	16.0	1,742.00	120.0	-922.4	1.47	1.09	0.623
P-DU7-120	16.0	778.00	120.0	741.4	1.18	0.32	0.416
P-DU7-130	20.0	317.00	120.0	-431.8	0.44	0.02	0.052
P-DU7-140	20.0	1,207.00	120.0	-308.6	0.32	0.03	0.028
P-DU7-150	20.0	1,514.00	120.0	-509.1	0.52	0.11	0.070
P-DU7-160	20.0	619.00	120.0	-476.5	0.49	0.04	0.062
P-DU7-170	12.0	1,073.00	130.0	-160.6	0.46	0.09	0.086
P-DU7-180	12.0	828.00	120.0	112.6	0.32	0.04	0.052
P-DU7-190	12.0	399.00	120.0	-310.5	0.88	0.13	0.337
P-DU7-200	12.0	2,378.00	120.0	165.7	0.47	0.25	0.105
P-DU7-210	12.0	1,049.00	120.0	-573.8	1.63	1.10	1.051
P-DU7-220	12.0	1,054.00	120.0	-513.6	1.46	0.90	0.856
P-DU7-230	12.0	1,714.00	120.0	-401.7	1.14	0.93	0.543
P-DU7-240	12.0	1,014.00	120.0	-300.3	0.85	0.32	0.317
P-DU8-010	16.0	1,107.00	120.0	-250.7	0.40	0.06	0.056
P-DU8-020	16.0	714.00	120.0	-758.6	1.21	0.31	0.434
P-DU8-030	16.0	1,312.00	120.0	-689.7	1.10	0.48	0.364
P-DU8-040	16.0	1,371.00	120.0	-775.0	1.24	0.62	0.452
P-DU8-050	16.0	520.00	120.0	-920.0	1.47	0.32	0.620
P-DU8-060	16.0	1,021.00	120.0	-1,183.8	1.89	1.01	0.990
P-DU8-070	8.0	542.00	120.0	-136.8	0.87	0.29	0.532
P-DU8-080	8.0	253.00	120.0	-51.9	0.33	0.02	0.088
P-DU8-090	8.0	1,138.00	120.0	-82.7	0.53	0.24	0.210

Active Scenario: Max Day Demand - Served by SCAP

FlexTable: Pipe Table

(144173_EM NPW_OP1_4-17-14.wtg)

Current Time: 0.000 hours

Label	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/1000ft)
P-DU8-100	12.0	599.00	120.0	278.2	0.79	0.16	0.275
P-DU8-110	12.0	709.00	120.0	129.6	0.37	0.05	0.067
P-DU8-120	8.0	678.00	120.0	-103.1	0.66	0.21	0.315
P-DU8-130	8.0	1,315.00	120.0	47.8	0.30	0.10	0.076
P-DU8-140	8.0	966.00	120.0	17.7	0.11	0.01	0.012
P-DU8-150	6.0	737.00	130.0	-11.4	0.13	0.01	0.018
P-DU8-160	8.0	1,265.00	120.0	30.1	0.19	0.04	0.032
P-DU8-170	8.0	2,613.00	120.0	-9.3	0.06	0.01	0.004
P-DU8-180	8.0	1,778.00	120.0	-43.7	0.28	0.11	0.064
P-DU8-190	8.0	1,185.00	120.0	45.9	0.29	0.08	0.070
P-DU8-200	8.0	1,054.00	120.0	131.6	0.84	0.52	0.495
P-DU9-010	16.0	904.00	120.0	-538.4	0.86	0.21	0.230
P-DU9-020	16.0	227.00	120.0	-507.9	0.81	0.05	0.206
P-DU9-030	8.0	1,616.00	120.0	-69.9	0.45	0.25	0.153
P-DU9-040	8.0	746.00	120.0	-67.9	0.43	0.11	0.146
P-DU9-050	8.0	869.00	120.0	-75.0	0.48	0.15	0.175
P-DU9-060	8.0	1,550.00	120.0	-96.7	0.62	0.43	0.280
P-DU9-070	8.0	1,001.00	120.0	-39.3	0.25	0.05	0.053
P-DU9-080	8.0	644.00	120.0	-54.9	0.35	0.06	0.098
P-DU9-090	8.0	3,092.00	120.0	-5.6	0.04	0.00	0.001
P-DU9-100	8.0	1,619.00	120.0	-45.3	0.29	0.11	0.069
P-DU9-110	8.0	3,057.00	120.0	-23.6	0.15	0.06	0.021
P-DU9-120	8.0	901.00	120.0	39.7	0.25	0.05	0.054
P-DU9-130	8.0	879.00	120.0	-139.9	0.89	0.49	0.555
P-DU9-140	8.0	430.00	120.0	-263.8	1.68	0.77	1.796
P-DU9-150	8.0	4,471.00	120.0	-61.2	0.39	0.54	0.120
P-SCAP	36.0	1,752.00	120.0	-11,050.0	3.48	2.09	1.193

APPENDIX D

Secondary Interim Non-Potable Water Modeling Results

FlexTable: Reservoir Table
Active Scenario: Shared C.A.P. Supply Line
(144173_EM NPW_OP2_4-17-14.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Flow Net (Out) (gpm)	Hydraulic Grade (ft)
NP BACKUP WELL	1,500.00	1,016	1,500.00

Bentley Systems, Inc. Haestad Methods Solution Center
27 Siemon Company Drive Suite 200 W
Watertown, CT 06795 USA +1-203-755-1666

FlexTable: Junction Table
Active Scenario: Shared C.A.P. Supply Line
(144173_EM NPW_OP2_4-17-14.wtg)

Current Time: 0.000 hours

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-301	1,420.00	0	25.8	1,479.56
J-303	1,415.00	0	28.3	1,480.44
J-306	1,412.00	0	33.6	1,489.76
PARK LAKE N	1,408.00	733	23.3	1,461.78
PARK LAKE S	1,420.00	283	25.0	1,477.67

FlexTable: Pipe Table
Active Scenario: Shared C.A.P. Supply Line
(144173_EM NPW_OP2_4-17-14.wtg)

Current Time: 0.000 hours

Label	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/1000ft)
P-602	8.0	1,072.00	130.0	283	1.81	1.89	1.763
P-605	12.0	3,615.00	130.0	283	0.80	0.88	0.245
P-609	12.0	3,567.00	130.0	-1,016	2.88	9.31	2.610
P-610	12.0	3,925.00	130.0	-1,016	2.88	10.24	2.610
P-611	8.0	1,816.00	130.0	733	4.68	18.66	10.276

APPENDIX E

City of Mesa and ADWR Memorandum of Understanding

CITY OF MESA

www.cityofmesa.org

Office of the City Manager

January 12, 2009

Sandy Fabritz-Whitney
Assistant Director, Water Management
Arizona Department of Water Resources
3550 North Central Avenue
Phoenix, AZ 85012

RE: **Deliveries of Water Received Pursuant to Water Exchange No. 69-213216 and Operation of the City of Mesa's Reclaimed Water System**

Dear Sandy:

The purpose of this letter is to memorialize the understanding between the City of Mesa, an Arizona Municipal Corporation, ("Mesa") and the Arizona Department of Water Resources ("Department") regarding certain deliveries of Central Arizona Project water ("CAP Water") received by Mesa from the Gila River Indian Community ("Community") in exchange for effluent. The parties by their signature below agree and acknowledge that this letter embodies their mutual understanding as to the legal significance of these deliveries under applicable law as of the date of this letter.

By way of history, Mesa, along with numerous other parties, including the State of Arizona and the United States, executed the Gila River Indian Community Water Rights Settlement Agreement dated February 4, 2003 ("Settlement"). This historic settlement resolved numerous and substantial claims by the Community for the use of over 1.5 million acre-feet of water on the reservation as well as for injuries alleged to have resulted from historic water use by other participants to the Settlement. This Settlement was approved by the United States through federal legislation in the form of the Arizona Water Settlements Act, Public Law 108-451. Additionally, on September 16, 2007, the Superior Court of Maricopa County, in accordance with the Arizona Supreme Court's May 16, 1991 Special Procedural Order Providing for the Approval of Federal Water Rights Settlements, including those of Indian Tribes, entered a Judgment and Decree approving the Settlement.

As part of the Settlement, Mesa and the Community (along with the City of Chandler) entered an agreement which provides that the Community will give CAP Water to Mesa in exchange for Mesa delivering effluent to the Community. The effluent to be delivered by Mesa to the Community will first be treated at a wastewater treatment facility regulated under Title 49, Chapter 2, Arizona Revised Statutes. The effluent will therefore meet the definition of "effluent" in A.R.S. § 45-101(A)(2).

20 East Main Street Suite 750
P.O. Box 1466
Mesa Arizona 85211-1466
480.644.3333 Tel
480.644.2175 Fax

The essential terms of this exchange agreement (the "Exchange") are described in Paragraph 18.0 of the Settlement. Pursuant to the Exchange, Mesa pays a "premium" for the CAP Water it receives from the Community – the Community will deliver eight tenths (.8) acre feet of CAP Water for every one (1) acre foot of effluent delivered by Mesa ("Exchange Ratio"). Only the Cities of Mesa and Chandler participated in this exchange of effluent for Community CAP Water.

The Department, having determined that the Exchange meets the requirements of A.R.S. § 45-1051, accepted the Notice of Water Exchange No. 69-213216 by letter dated December 19, 2006. The Director also determined pursuant to A.R.S. § 45-1052(6)(b) that the Exchange Ratio was "beneficial to water management in this state."

Pursuant to A.R.S. § 45-1003(A)(2), a person who receives water pursuant to a water exchange or a water exchange contract may use the water only in the same manner in which the person had the right to use the water the person gave in trade. The CAP Water Mesa receives from the Community therefore can be used in the same manner as effluent for purposes of Title 45, Arizona Revises Statutes, and it is legally characterized as effluent. The Department is committed to its policy that encourages the direct use of effluent supplies for non-potable purposes and reserving supplies that can be treated for potable uses to be used for potable purposes. Although the Department encourages Mesa to use its CAP Water supplies for potable purposes, with the law being what it currently is, the Department will recognize the character of the CAP water received by Mesa from the Community as effluent. The CAP Water Mesa receives from the Community is hereinafter referred to as "Effluent Exchange Water."

Under the Settlement, the Effluent Exchange Water is to be delivered to Mesa at a CAP turnout from the CAP canal. In order to take delivery of the Effluent Exchange Water, and to transport certain other supplies of CAP water, Mesa will be constructing a gravity transmission pipeline ("Canal Extension Line") from its planned southern CAP turnout structure. The Canal Extension Line will transport water via gravity for a distance of approximately 2.5 miles from the CAP turnout in alignment with Elliot Road ("CAP Turnout"). The Canal Extension Line will then end in a Splitting Structure ("Delivery Point"), from which two completely separate and distinct pipelines will exit. One line ("Treatment Line") will carry water from the Delivery Point to Mesa's planned South CAP Water Treatment Plant, and the other ("Reclaimed System Line") will carry water from the Delivery Point to customers for non potable uses without treatment.

Although the water carried through the Canal Extension Line will be a combination of Effluent Exchange Water and CAP Water, Mesa would like to account for the water in a different manner after it goes through the Splitting Structure. Mesa would like to account for all the water carried through the Reclaimed System Line as Effluent Exchange Water and account for all the water carried thorugh the Treatment Line as a combination of Effluent Exchange Water and CAP Water.

Generally, the Department's policy on deliveries of commingled water ("Commingled Water Policy") is that if a municipal water provider transports a combination of two or

more types of water through a pipeline for delivery to its customers during a year, the water must be accounted for as if each customer receives a combination of each type of water transported through the pipeline during the year and in the same proportions as those waters were carried through the pipeline during the year. Notwithstanding this policy, the Department and Mesa agree that Mesa may account for the commingled water it transports through the Canal Extension Line in the manner requested by Mesa (i.e., the Reclaimed System Line will carry only Effluent Exchange Water and the Treatment Line will carry a combination of Effluent Exchange Water and CAP Water), under the terms and conditions described below. The Department is willing to allow Mesa to account for the water in this manner because: (1) Mesa is required under the Settlement to take the Effluent Exchange Water from the CAP canal, and it would be unreasonable to require Mesa to build two pipelines from the CAP canal – one to carry the Effluent Exchange Water and another to carry Mesa's CAP water; and (2) allowing Mesa to account for the water in this manner will facilitate Mesa's use of the Effluent Exchange Water and, therefore, facilitate the Settlement.

The terms and conditions of this agreement are as follows:

1. All of the water entering the Reclaimed System Line at the Delivery Point during a year shall be considered Effluent Exchange Water, provided that the volume of water entering the Reclaimed System Line at the Delivery Point is equal to or less than the volume of Effluent Exchange Water received by Mesa at the CAP Turnout during the year. Mesa shall maintain and operate the Reclaimed System Line in such a manner that it shall transport and distribute exclusively Effluent Exchange Water and/or other supplies which constitute effluent as defined in A.R.S. § 45-101(4). To supplement the Effluent Exchange Water, Mesa intends to construct one or more wells, which will be designated as a recovery wells pursuant to A.R.S. § 45-834.01. Thereafter, during any periods when Effluent Exchange Water is not available in sufficient amounts to serve the normal non-potable demands of customers on the Reclaimed System Line, Mesa shall account for water withdrawn from the recovery wells and transported and delivered through the Reclaimed System Line as effluent recovered pursuant to Long Term Storage Credits obtained pursuant to and in accordance with A.R.S. § 45-831.01 *seq.* Notwithstanding this, annual deliveries via the Reclaimed System Line shall be limited to a total of six thousand (6,000) acre feet.

2. Notwithstanding paragraph 1 above, if the volume of water entering the Reclaimed System Line at the Delivery Point during a year is greater than the volume of Effluent Exchange Water received by Mesa at the CAP Turnout during the year, the difference shall be accounted for as CAP Water and the water transported through the Reclaimed System Line during the year shall be accounted for consistent with the Department's Commingled Water Policy. In that event, if any of the water transported through the Reclaimed System Line during the year is used to fill or refill a body of water, the body of water shall not qualify for an exemption from Title 45, Chapter 1, Article 3 (pertaining to regulation of bodies of water) in that year pursuant to A.R.S. § 45-132(B)(4).

3. Except as provided in paragraph 4 below, all water in the Treatment Line subsequent to the Delivery Point shall be considered commingled CAP Water and Effluent Exchange Water, for all purposes under Title 45, Chapter 2 (the Groundwater Code) and Management Plans adopted pursuant thereto. The volume of Effluent Exchange Water that is included in the commingled water during a year shall be the difference between the volume of Effluent Exchange Water received by Mesa at the CAP Turnout during the year and the amount of water entering the Reclaimed System Line at that Delivery Point during the year. Deliveries of this commingled water to customers shall be accounted for consistent with the Department's Commingled Water Policy.

4. If in any year the volume of water entering the Reclaimed System Line at the Deliver Point is equal to or greater than the volume of Effluent Exchange Water received by Mesa at the CAP Turnout during the year, all of the water entering the Treatment Line at the Delivery Point during the year shall be considered to be CAP Water.

5. Mesa shall comply with the following measuring and reporting requirements:
   (a) Mesa shall measure with an approved measuring device the volume of water entering the Canal Extension Line at the CAP Turnout during a year and report that volume in its annual report for the year.
   (b) Mesa shall measure with an approved measuring device the volume of water entering the Reclaimed System Line at the Delivery Point during a year and report that volume in its annual report for the year.
   (c) Mesa shall measure with an approved measuring device the volume of water entering the Treatment Line at the Delivery Point during a year and report that volume in its annual report for the year.
   (d) Mesa shall report in its annual report for a year the volume of Effluent Exchange Water received from the Community at the CAP Turnout during the year.

6. The Reclaimed System Line shall be operated by Mesa in a manner similar to its potable distribution system. Impact and Service Connection fees will be adopted and made applicable to all customers. Service will be subject to the City's Terms and Conditions for the Sale of Utilities, as adopted by the City. Rates shall be adopted in accordance with A.R.S. § 9-511.01, and apply uniformly to all costumers receiving non-potable service.

7. Mesa shall not make or allow any connections to the Canal Extension Line prior to the Delivery Point.

Based on all the above, and subject to paragraph 2 above, the Department and Mesa recognize, agree and acknowledge that all deliveries from Mesa's Reclaimed System Line shall constitute deliveries of effluent as defined in A.R.S. § 45-101(4). As a result, such deliveries will qualify as "effluent" for the purposes of determining and applying

usage restrictions and limitations as set forth in Title 45, Chapter 1, Article 3 (pertaining to regulation of bodies of water) and Chapter 2 (Groundwater Code) and the Management Plans adopted pursuant thereto.

The parties agree that the understanding set forth in this memorandum is based on laws as they existed on the date signed by the parties, which are subject to legislative revision and judicial interpretation which may necessitate a review of the understanding set forth herein. In the event either party becomes aware of such a change, it will provide the other notice thereof as soon as reasonably practicable. The parties further agree that nothing herein is intended to act as a waiver of the rights or responsibilities under applicable law.

Signed and acknowledged as of the date set forth below.

CITY OF MESA

By _____

Its City Manager

01/13/09

Date

ARIZONA DEPARTMENT OF WATER RESOURCES

By _____

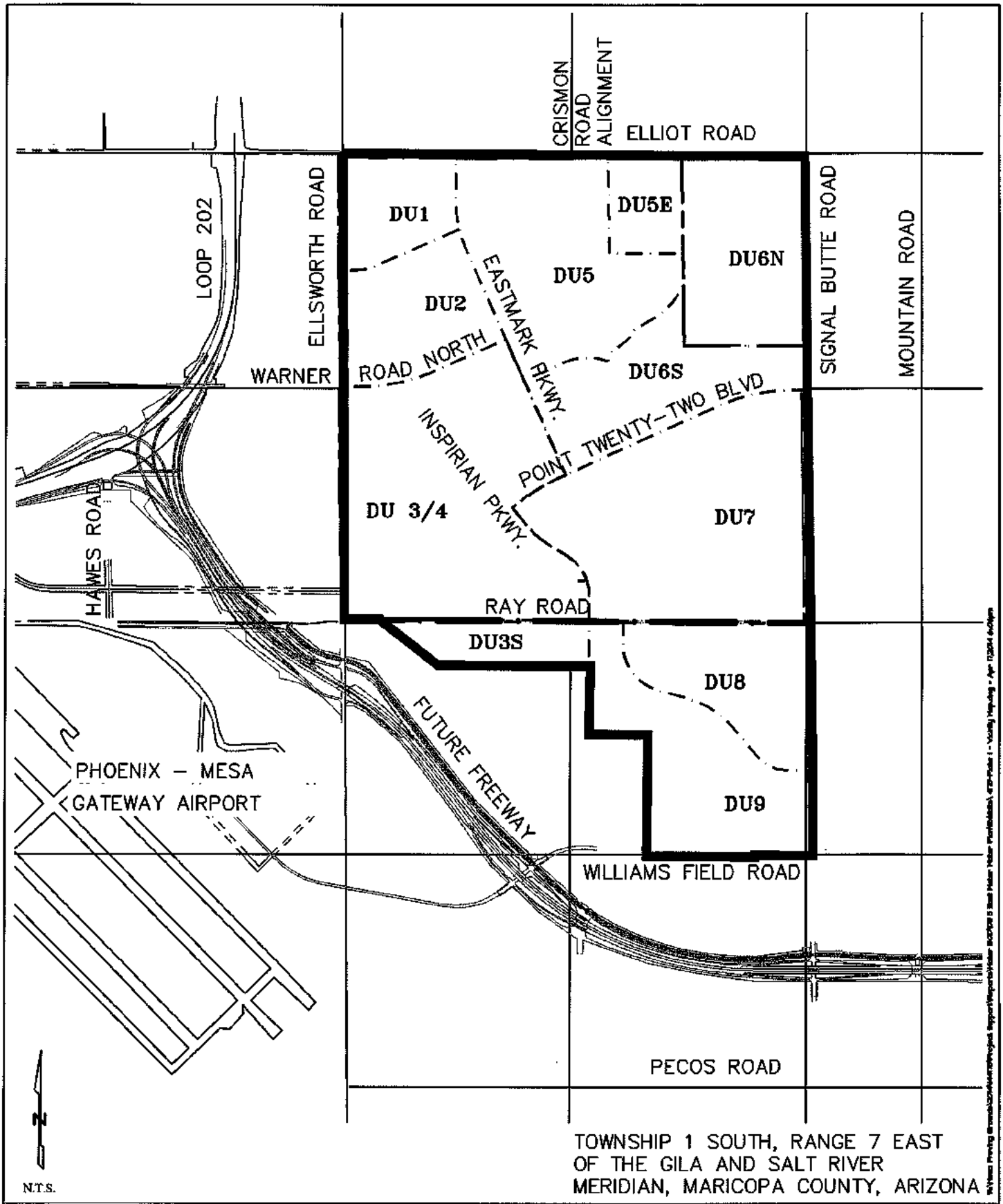
Its ASSISTANT DIRECTOR - Water Management

26 JANUARY 2009

Date

PLATE 1

Vicinity Map



TOWNSHIP 1 SOUTH, RANGE 7 EAST
OF THE GILA AND SALT RIVER
MERIDIAN, MARICOPA COUNTY, ARIZONA

NOT FOR CONSTRUCTION
OR RECORDING

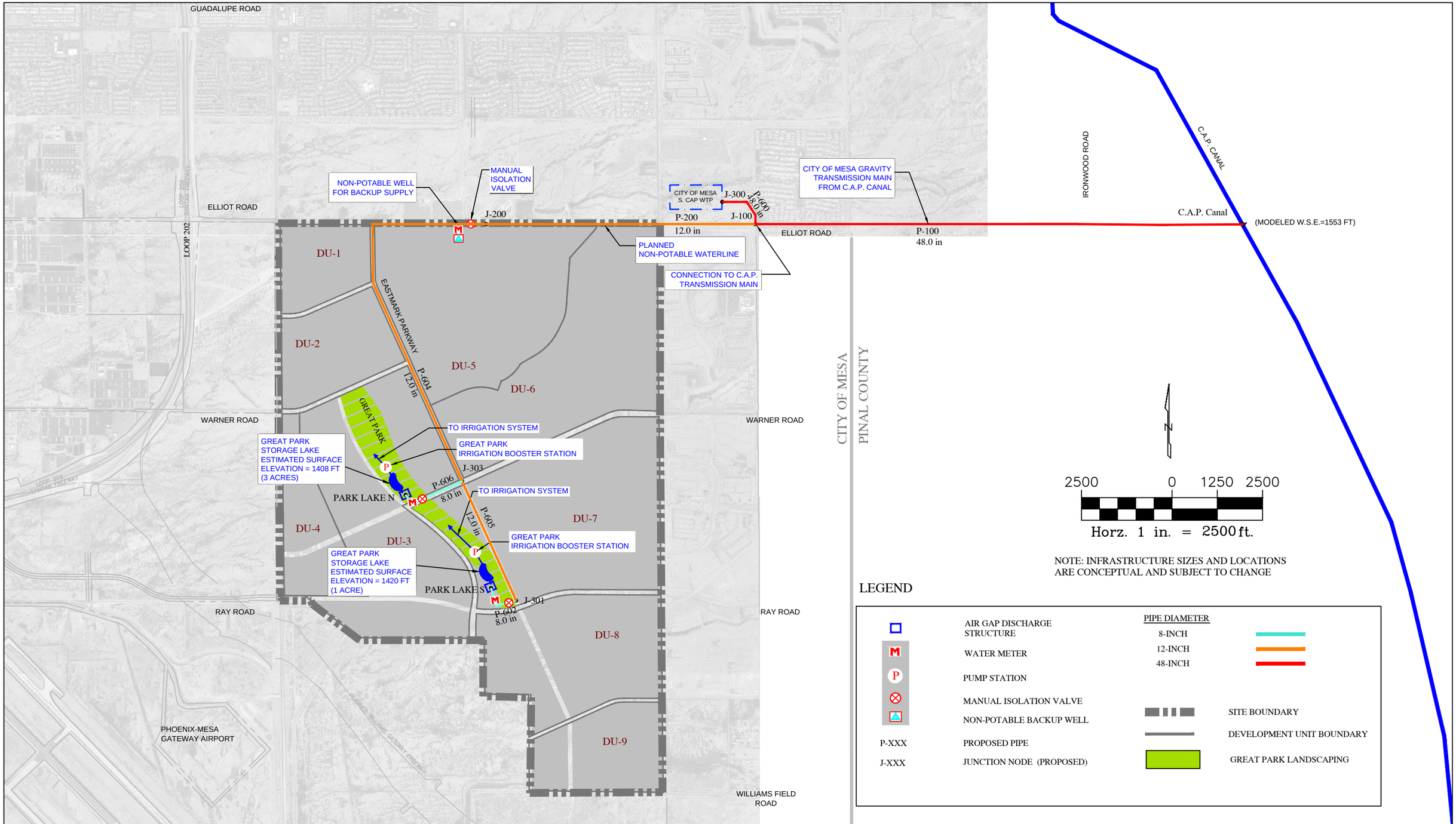
PLATE 1: VICINITY MAP

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
PHOENIX • MESA • TUCSON

PLATE 2

Full Build-Out Master Non-Potable Water Exhibit



NOTE: INFRASTRUCTURE SIZES AND LOCATIONS ARE CONCEPTUAL AND SUBJECT TO CHANGE

LEGEND

	AIR GAP DISCHARGE STRUCTURE
M	WATER METER
P	PUMP STATION
	MANUAL ISOLATION VALVE
	NON-POTABLE BACKUP WELL
P-XXX	PROPOSED PIPE
J-XXX	JUNCTION NODE (PROPOSED)

PIPE DIAMETER

- 8-INCH
- 12-INCH
- 48-INCH

- SITE BOUNDARY
- DEVELOPMENT UNIT BOUNDARY
- GREAT PARK LANDSCAPING

NOT FOR CONSTRUCTION OR RECORDING

PLATE 2 - FULL BUILD-OUT MASTER NON-POTABLE WATER EXHIBIT

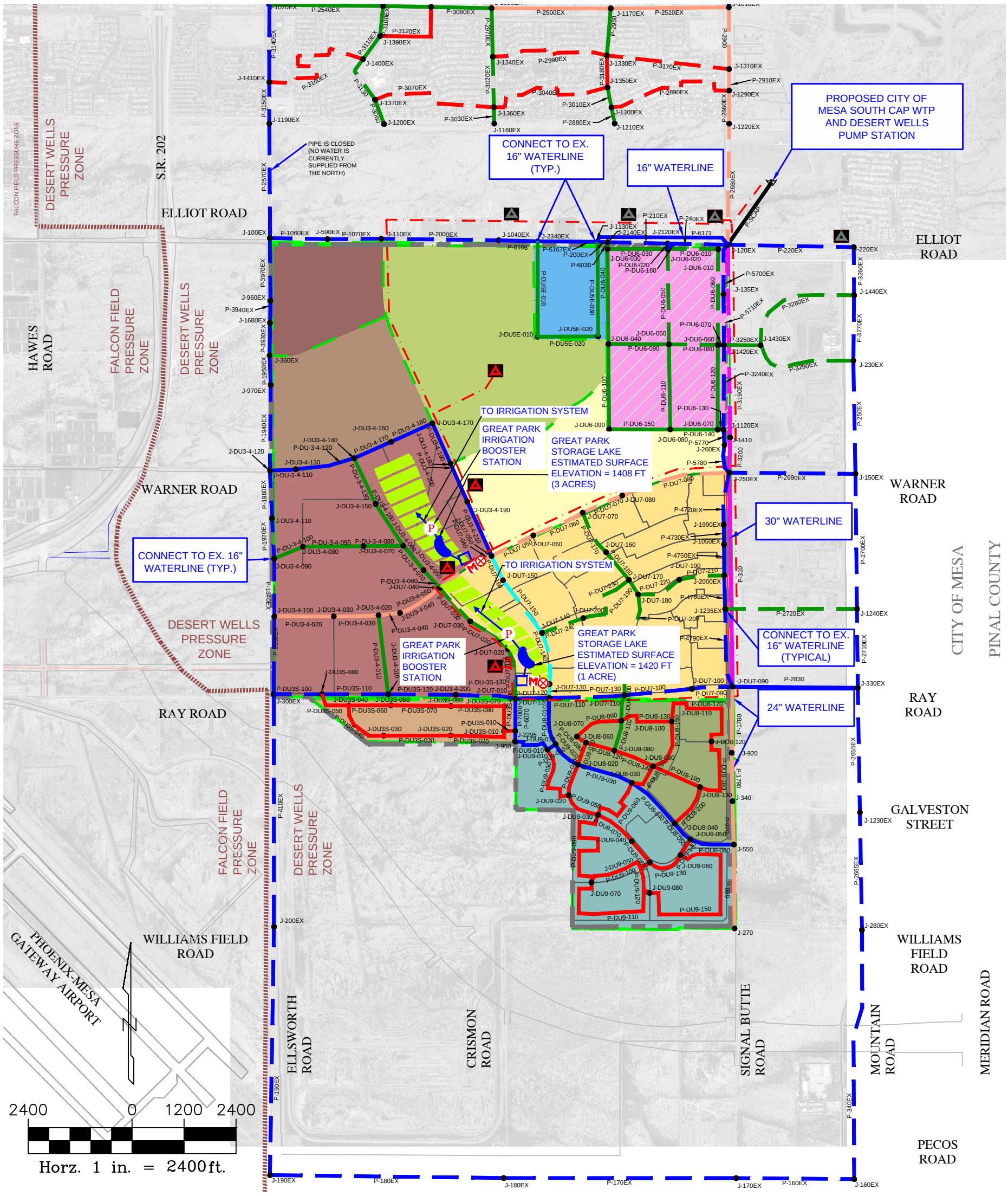
EASTMARK
MESA, ARIZONA

WOOD/PATEL
LAND DEVELOPMENT ● WATER RESOURCES
STRUCTURES ● TRANSPORTATION / TRAFFIC
WATER / WASTEWATER ● SURVEYING
CONSTRUCTION MANAGEMENT

R:\Mesa Proving Grounds\2014\144173\Project Support\Reports\Non-Potable\WaterCAD\ 4173NPW_FBO_4-17-14.dwg - Apr 18,2014 1:00pm

PLATE 3

Primary Interim Master Non-Potable Water Exhibit



LEGEND

NOTES:
1. INFRASTRUCTURE SIZES AND LOCATIONS ARE CONCEPTUAL AND SUBJECT TO CHANGE.

PIPE DIAMETER	EXISTING	PLANNED
8-INCHES		
12-INCHES		
16-INCHES		
20-INCHES		
24-INCHES		
30-INCHES		
WELL SITE		
WELL COLLECTION LINE		
PRESSURE ZONE BOUNDARY		

- JUNCTION NODE
- WATER SOURCE
- P-XXX — PROPOSED PIPE
- P-XXXEX — EXISTING PIPE
- J-XXX — JUNCTION NODE (PROPOSED)
- J-XXXEX — JUNCTION NODE (EXIST.)
- MODELED PRESSURE ZONE : DESERT WELLS

- AIR GAP DISCHARGE STRUCTURE
- WATER METER
- PUMP STATION
- MANUAL ISOLATION VALVE

ON-SITE DEVELOPMENT UNITS

DU-1	DU-5	DU-7
DU-2	DU-5E	DU-8
DU-3S	DU-6N	DU-9
DU-3/4	DU-6S	GREAT PARK

DU-4A — DEVELOPMENT UNIT SUB-AREA

SITE BOUNDARY

PLATE 3- PRIMARY INTERIM MASTER NON-POTABLE WATER EXHIBIT SERVED BY SCAP

EASTMARK
MESA, ARIZONA

NOT FOR CONSTRUCTION OR RECORDING

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
PHOENIX • MESA • TUCSON

PLATE 4

Secondary Interim Master Non-Potable Water Exhibit

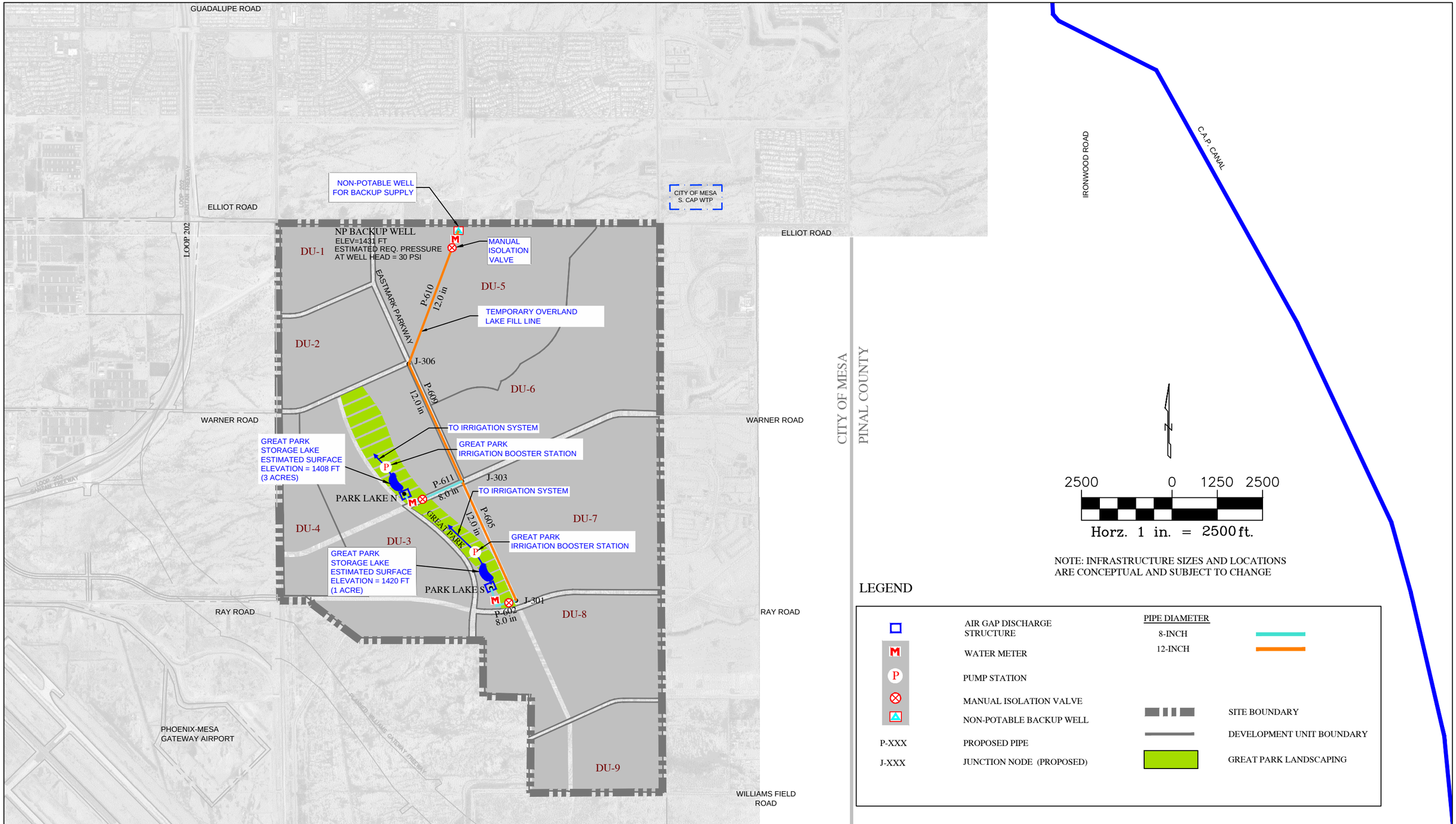


PLATE 4 - SECONDARY INTERIM MASTER NON-POTABLE WATER EXHIBIT

NOT FOR CONSTRUCTION OR RECORDING

EASTMARK
MESA, ARIZONA

WOOD/PATEL
LAND DEVELOPMENT ● WATER RESOURCES
STRUCTURES ● TRANSPORTATION / TRAFFIC
WATER / WASTEWATER ● SURVEYING
CONSTRUCTION MANAGEMENT

R:\Mesa Proving Grounds\2014\144173\Project Support\Reports\Non-Potable\WaterCAD\144173_EM NPW_OP2_4-17-14.dwg - Apr 18,2014 1:03pm