a recreational
lifestyle community

WOODMEN HILLS

WOODMEN HILLS METROPOLITAN DISTRICT

REGIONAL WATER RECLAMATION FACILITY

SITE DEVELOPMENT PLAN DRAINAGE LETTER

August 2017

Prepared By:

JDS-HYDRO CONSULTANTS, INC.

545 EAST PIKES PEAK AVENUE • COLORADO SPRINGS, CO • 80903 • (719) 227-0072 • FAX (719) 471-3401

JDS-HYDRO CONSULTANTS, INC.

Nina Ruiz
El Paso County Planning & Community Development
2880 International Circle
Colorado Springs, CO 80910

August 7, 2017

RE: Woodmen Hills Metropolitan District
Regional Water Reclamation Facility
Drainage Letter

The purpose of this drainage letter is to satisfy requirements of the El Paso County Site Development Plan process for the proposed upgrades to the Woodmen Hills Metropolitan District (WHMD) Regional Water Reclamation Facility (RWRF).

Property Description:

The subject property is located in Tract K, Meridian Ranch Filing No. 1, approximately 15 miles northeast of downtown Colorado Springs and near the intersection of Stapleton Dr. and Meridian Ranch Blvd. The existing treatment facility consists of a lagoon system constructed in the 1980s with several upgrades performed in the 1990s and 2000s. The site is currently zoned PUD and has a total area of 13.62 acres. However, the upgrades will only impact 5.7 acres of the total site.

The intention of the applicant is to construct upgrades to the existing facility in order to meet effluent requirements of a new Discharge Permit from the Colorado Department of Health & Environment (CDPHE). The upgrades will generally consist of new concrete basins for treatment of wastewater, and a building housing secondary clarifiers, pump gallery, solids dewatering equipment, solids load out facility and office space.

General Existing Drainage Characteristics:

The major drainage characteristics include the conveyance of water (via sheet-flow) southeast across the site into a swale which then flows into existing storm drain infrastructure within Stapleton Dr. The site is entirely outside the 100-year floodplain as shown in the floodplain map included with this letter.

According to the NRCS, the native soil on the site is Columbine gravelly sandy loam, soil group A. The existing surfaces on the site consist of native material, recycled asphalt and HDPE lined basins.

The table below shows the runoff coefficients for the existing site which were taken from Table 6-6 of the City of Colorado Springs Drainage Criteria Manual (DCM) Volume 1.

Site Composition (SF)		**C_5**	**C_{10}**	**C_{100}**
Recycled Asphalt	22,600	0.59	0.63	0.7
Ponds	30,800	0	0	0
Native	194,892	0.09	0.17	0.36
Total	**248,292**	**0.12**	**0.19**	**0.35**

The following table displays the peak runoff flow rate for the existing site and the corresponding rainfall intensity used to calculate it. The runoff was calculated using the Rational Method and the time of concentration was calculated to be approximately 23.5 minutes.

	5-year	10-year	100-year
Intensity (in/hr)	2.84	3.31	4.76
Q (CFS)	2.01	3.60	9.40

Proposed Drainage Characteristics:

The proposed drainage from this site will generally remain the same as the existing drainage. The drainage swale shall be improved and the overall site slope shall be reduced. The table below contains the runoff coefficients for the proposed site improvements which were also taken from Table 6-6 of the DCM.

Site Composition (SF)		C_5	C_{10}	C_{100}
Roof	15,500	0.73	0.75	0.81
Pavement	1,700	0.9	0.92	0.96
Aggregate Base	33,200	0.59	0.63	0.7
Basins	39,300	0	0	0
Native	158,592	0.09	0.17	0.36
Total	**248,292**	**0.19**	**0.25**	**0.38**

The following table displays the peak runoff flow rate for the proposed site and the corresponding rainfall intensity used to calculate it. The runoff was calculated using the Rational Method and the time of concentration was calculated to be approximately 28.5 minutes. The time of concentration increased due to the reduced slope of the proposed overland flow area.

	5-year	10-year	100-year
Intensity (in/hr)	2.56	2.99	4.30
Q (CFS)	2.75	4.19	9.33

While these calculations project slight increases in the 5- and 10-year peak flows, the 100-year flow peak flow projection is less than existing. This is primarily due to the increased time of concentration and the increase in the area that captures 100% of the rainfall.

Runoff from the site improvements will generally flow south and east into an improved drainage channel, which then flows into an existing 24-inch RCP culvert at the southeast portion of the site. From that point, flow enters storm sewers in Stapleton Drive and conveys water to a defined channel on the Antler Creek Golf Course, which borders the site on the north and east. Once released into the channel on the golf course, it flows through a box culvert below Stapleton Drive and eventually into a riprap channel which conveys flows to the existing Bennett Ranch regional detention pond.

The Bennett Ranch detention pond is located in Woodmen Hills Filling #11, southwest of the intersection of Stapleton Drive and Eastonville Road.

According to Section 1.5 of the DCM:

> *Detention storage of storm water runoff may be necessary in certain drainage basins to attenuate peak flood flows. Regional detention ponds are required in place of numerous smaller detention ponds.*
>
> *and…*
>
> *The City/County drainage policy permits the use of detention storage of storm water runoff when compatible with drainage basin studies and/or other approved studies. Regional detention storage facilities shall be utilized where necessary and approved to afford public safety, provide for economic development of basin drainage systems or to protect downstream developments from flood damage.*

The *Meridian Ranch Filing #1 Drainage Plan* prepared by URS and accepted by El Paso County in 2002 listed the wastewater treatment facility site as part of the overall drainage plan.

Due to the projected 100-year peak flows releasing at essentially the same rate (even slightly less) than historic flows, and since the *Meridian Ranch Filing #1 Drainage Plan* accounted for improvements specifically at the Wastewater Treatment Facility site, water quality storage is not required. There are also no anticipated negative impacts to downstream properties.

Drainage Fees:

The site is located in the Bennett Ranch drainage basin. There are no drainage fees associated with a Site Development Plan application.

Respectfully,
JDS-Hydro Consultants, Inc.

Ryan M. Mangino, P.E.

Enclosures

Floodplain Map (FIRM)
Drainage Map

Drainage Reports

Design Engineer's Statement:

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the applicable master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

Ryan M. Maugino, PE #43304

8/3/17
Date

Owner/Developer's Statement:

I, the owner/developer have read and will comply with all of the requirements specified in this drainage report and plan.

Joshua Killett, Board President
Woodmen Hills Metropolitan District
8046 Eastonville Road, Peyton, CO 80831

8 Aug 17
Date

El Paso County:

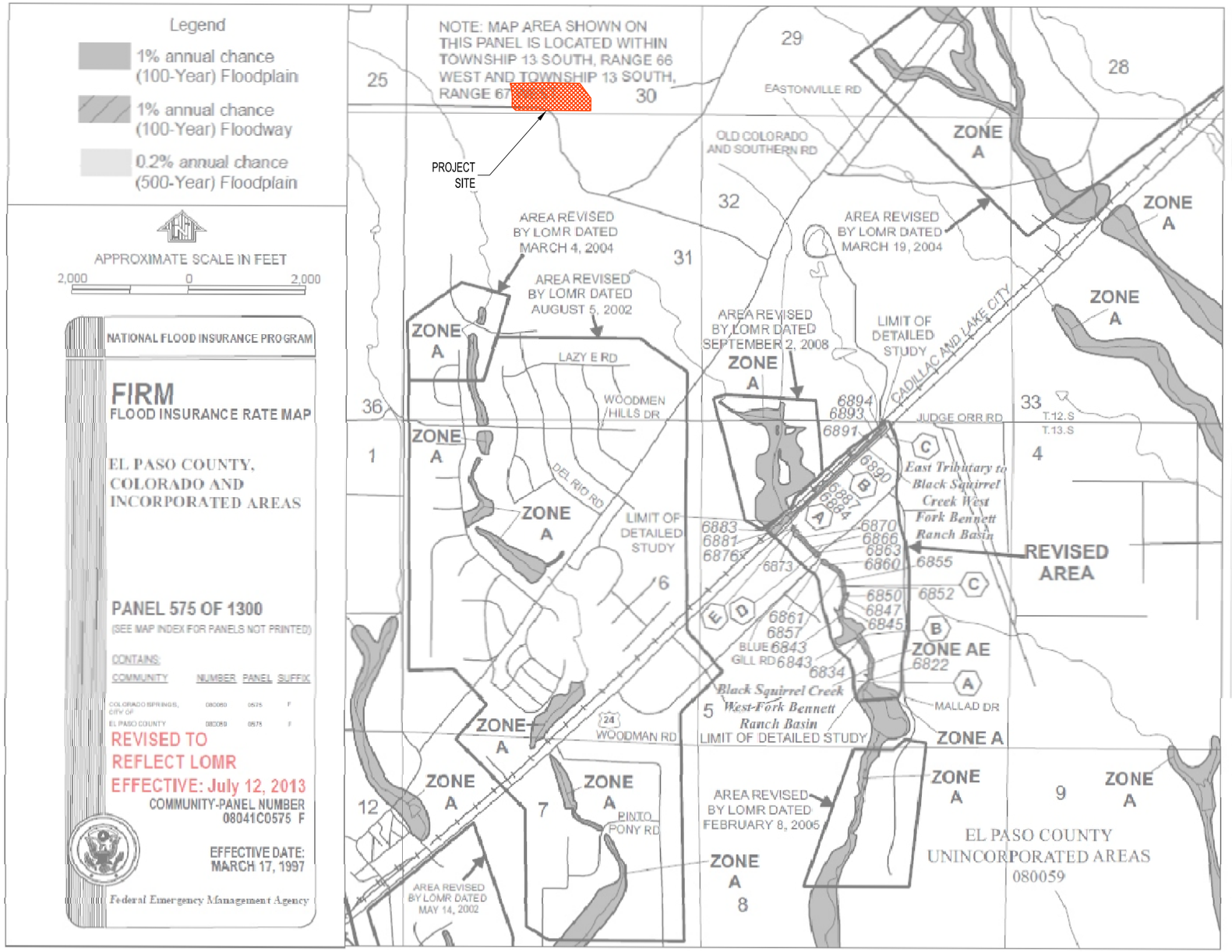
Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

Approved
By:Jennifer Irvine, County Engineer
Date:11/08/2017
El Paso County Department of Public Works

Jennifer Irvine, P.E.
County Engineer / ECM Administrator

Date

Conditions:



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WOODMEN HILLS METROPOLITAN DISTRICT REGIONAL WATER RECLAMATION FACILITY

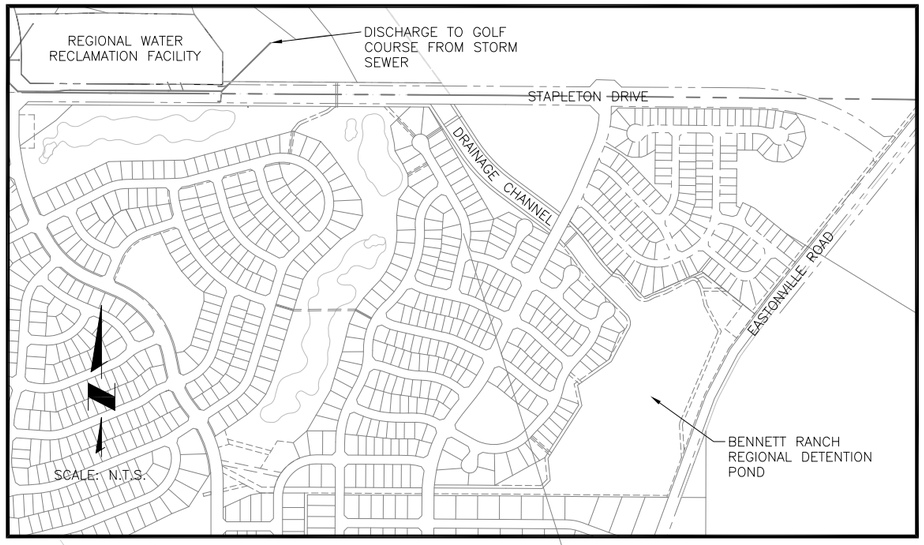
FLOODPLAIN MAP

Project No.:	112.88
Scale:	AS NOTED
Date:	07/07/17
Design:	RMM
Drawn:	RMM
Check:	JPM
Revised:	

F1

of 1

0 50' 100'
11X17 SCALE: 1"=100'
24X36 SCALE: 1"=50'



MERIDIAN RANCH GOLF COURSE, LLC

EXISTING FENCE

PROPOSED RETAINING WALL

EXISTING BOUNDARY TRACT K, MERIDIAN RANCH FILING #1

20.0' UTILITY EASEMENT

PROPOSED PARKING LOT CRUSHED CONCRETE OR CLASS VI BASE COURSE

PROPOSED WASTEWATER TREATMENT FACILITY FF EL: 7049'-0"

EXISTING POND 1

PROPOSED SLUDGE HOLDING BASINS

EXISTING POND 2

EXISTING POND 3

EXISTING POND 4

MERIDIAN RANCH BLVD.

EXISTING HEADWORKS

20.0' UTILITY EASEMENT

PROPOSED RIGHT-OUT

PROPOSED 18" CMP CULVERT

STAPLETON DRIVE

EXISTING 24" RCP CULVERT TO STORM SEWER IN STAPLETON DRIVE

MERIDIAN RANCH GOLF COURSE, LLC

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WOODMEN HILLS METROPOLITAN DISTRICT REGIONAL WATER RECLAMATION FACILITY DRAINAGE MAP

PCD FILE NO: PPR-17-027

Project No.:	112.88
Scale:	AS NOTED
Date:	08/07/17
Design:	RMM
Drawn:	RMM
Check:	JPM
Revised:	

DR1
of 1