AMENDMENT TO WATERVIEW
MASTER DRAINAGE DEVELOPMENT PLAN
EL PASO COUNTY, COLORADO

July 7, 2013

PREPARED FOR:

Cygnet Land
31 N. Tejon
Suite 308
Colorado Springs, CO 80903

PREPARED BY:

Springs Engineering
31 N. Tejon Street, Suite 311
Colorado Springs, CO 80903
719.227.7388

PROJECT NO.13-006

CERTIFICATIONS

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.

_____ Seal

Charles K. Cothern, P.E. #24997

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.

By (signature): _____ Date: _____

Title: _____

Address: 31 N. Tejon, Suite 308

Colorado Springs, CO 80903

El Paso County:

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

_____ _____

Andre P. Brackin, P.E., Date

County Engineer / ECM Administrator

Table of Contents

List of Figures

Appendix

PURPOSE

This report is an Amendment to the Master Drainage and Development Plan for Waterview. The purpose of this report (MDDP) is to present changes to major drainage ways, detention/water quality areas, locations of major culvert crossings, open channels and off site areas tributary to the Waterview development based on modifications to the zoning areas. Runoff quantities and proposed facilities have been calculated using the current City of Colorado Springs/El Paso County Drainage Criteria Manual (DCM).

Waterview encompasses approximately 721.8 acres. There is approximately 302 acres in the Waterview development, west of Powers. Single Family accounts for 43.7 acres, Multi-Family is 46.19 acres, Commercial is 41.2 acres and Parks/Open Space is 85 acres.

Waterview east of Powers encompasses approximately 419.8 acres. 78.3 acres will consist of open space, 85.9.3 acres is designated commercial, 81.2 acres will consist of industrial/warehouse with the remaining 174.4 acres set aside for single family development. All roadways will have curb and gutter.

MAJOR DRAINAGE BASINS

The Waterview development site is located within 3 major drainage basins, Big Johnson Reservoir in the middle with Windmill Gulch on the east and Jimmy Camp Creek on the west.

Filings 1-4 for Waterview have already been built and are located within the Windmill Gulch Basin. A portion of Filing No. 5 is within the Windmill Gulch and the remainder is located within the Big Johnson Basin. Filing No. 6 and 7 along with the additional area added during the Sketch Plan amendment is also within the Big Johnson Basin.

Previous reports were based that developed flows would be able to be released into the Big Johnson Reservoir and no detention would be required as long as water quality measures were taken within the basin. However, within recent years, this is no longer the case. Detention will be required within the Big Johnson Basin, as well as in the Jimmy Camp.

There is currently no approved Drainage Basin Planning Study (DBPS) for Jimmy Camp. This report may be updated if/when a DBPS is approved.

Design, phasing, responsibility and maintenance of any proposed improvements will be discussed in future drainage reports. Fees will be assessed and paid according to the current rates at the time of platting for each filing.

Climate

The climate of the site is typical of a sub-humid to semiarid climate with mild summers and winters. The average temperature is 31 degrees F in the winter and 68.4 degrees in the summer. Total annual precipitation is 15.21 inches.

Floodplain Statement

The Flood Insurance Rate Map (FIRM No. 08041C0768-F dated 3/17/99) indicates that there is no floodplain in the vicinity of the proposed site. See Figure 3: FIRM.

Drainage Basins and Sub-Basins

Major Basin Description

Waterview development lies within 3 major basins, Windmill Gulch, Big Johnson and Jimmy Camp Creek Drainage Basins. This report is updating the Master Development Drainage Plan for Waterview by Merrick and Company. Development has already occurred within the eastern half of the site and is continuing as this report is addressing additional area added in to the Waterview Sketch Plan. Final Drainage Reports have already been approved for Filings No. 1-4, Filing No. 5 is currently being reviewed and the Filing No. 6 and 7 reports are being revised to include the additional area being added to the development site. All of these reports meet and exceed the recommendations of the original MDDP.

The middle portion of the site (which includes Filing No. 6 and 7) drains to the Big Johnson Reservoir and will need to be detained prior to crossing under Powers Boulevard. The remainder of the site is

within the Jimmy Camp Basin and will also need to be detained prior to exiting the site. All developed runoff will meet El Paso County standards for water quality and discharge rates.

Sub-Basin Description

Historic Drainage Patterns

The historic drainage patterns of the site were analyzed in the Master Development Drainage Plan for Waterview by Merrick and Company. No new historic calculations were done and copies of this analysis have been included in the appendix for reference.

Off-Site Drainage

There is one off-site basin within the Jimmy Camp Creek Basin; this basin was analyzed in the MDDP for Waterview by Merrick. Those calculations have been used for this basin as there has been no change in the characteristics of this basin.

DRAINAGE DESIGN CRITERIA

Development Criteria Reference

The City of Colorado Springs/El Paso County Drainage Criteria Manual (DCM) was used in preparation of this report. Additional preliminary and final drainage plans, master development drainage plans and drainage basin planning studies used in the preparation of the report are listed in the References Section.

Hydrologic Criteria

Rational Method

The rational method was used to determine onsite flows, as required by the current City of Colorado Springs/El Paso County Drainage Criteria Manual (DCM). Both the 5-year and 100-year storm events were considered in this analysis. Runoff coefficients appropriate to the existing and proposed land uses were selected for an SCS type “B” soil from Table 5-1 of the DCM. The time of concentration was calculated per DCM requirements Rational Method results are shown in the Appendix. HydroCAD was used to determine the basin flows and design the detention pond features.

Culvert Design

Both basins will be fully developed. Full developed flows will be directed to detention facilities which will hold flows to historic rates. Ponds and culverts were sized based on the 100-year storm.

Detention Storage Criteria

This report addresses the preliminary design stage of the detention/water quality features within the proposed development. Ponds were sized on flow routing through HydroCAD and water quality was based on the UDFCD Volume 3 spreadsheet for an Extended Detention Basin.

Preliminary storage volumes and outflows have been calculated for all detention facilities. A final design has been completed for all the approved drainage reports. A copy of these designs have been included in the appendix, as detention was not considered in the original MDDP report. Preliminary

design calculations have been provided for ponds which have not been constructed/approved yet and final calculations will need to be completed at the time of final platting for any of these facilities.

DRAINAGE BASINS

Offsite Basins

There is one off site basin which contributes flow to the Jimmy Camp Basin of the development.

Existing Drainage Analysis

Big Johnson Basin & Windmill Gulch Basins

The Big Johnson and Windmill Gulch historic basins do not differ from the drainage patterns or flow rates described in the DBPS by Kiowa Engineering. These excerpts have been included in the Appendix for reference.

Jimmy Camp Basin

The historic basins for the Jimmy Camp basin do not differ from the MDDP for Waterview report. The map and calculations have been included in the appendix for reference and are summarized below.

- Design Point JCH-A (Q_{10}=34 cfs, Q_{100}=69 cfs) located in the southeast corner of the site is the discharge point for Basin JCH-1. These flows enter a natural drainage swale and flow offsite.

- Design Point JCH-B (Q_{10}=170 cfs, Q_{100}=335 cfs) located in the southeast corner of the site is the discharge point for Basin JCH-2. These flows enter a natural drainage swale and flow offsite. An existing stockpond is located just downstream of this design point.

- Design Point JCH-C (Q_{10}=10 cfs, Q_{100}=25 cfs) located at Bradley Road, is the discharge point for Basin JCH-3. Flows in this basin are carried within the roadside ditch.

- Design Point JCH-D (Q_{10}=161 cfs, Q_{100}=359 cfs) is located north of Bradley Road and is the discharge for Basin JCH-4 and offsite basin JCH OS-1.

Proposed Drainage Analysis

Windmill Gulch Basin

Detailed hydrology calculations have been performed for the Waterview development through the various Final Drainage Reports for Filings No. 1 through No. 7. Copies of these have been provided in the Appendix.

Big Johnson Basin

The developed conditions for the Big Johnson Reservoir, which are not part of Waterview Filings No. 5 through 7, are described by 2 basins, BJD-12 (Design Point BJD-K) and BJD-13 (Design Point BJD-M). Each of these basins was previously analyzed in the MDDP for Waterview by Merrick.

- Design Point BJD-K (Q_{10}=109.8, Q_{100}=170.9) is the basin on the north portion of Powers Boulevard, Basin BJD-12. The flow will enter a proposed detention pond where it will then

release historic flows through a proposed culvert under the roadway. A water quality feature will be required at this location. Preliminary Design has been included in the Appendix.

- Design Point BJD-M (Q_{10}=211.9, Q_{100}=330.0) is the basin on the east side of Powers Boulevard, Basin BJD-13. The flow will enter a proposed detention pond where it will then release historic flows through a proposed culvert under the roadway. A water quality feature will be required at this location. Preliminary Design has been included in the Appendix. The current pipes located under the roadway will be replaced with the new pipe/outlet for the pond.

Jimmy Camp Creek Basin

There are 3 drainage basins located within the Jimmy Camp Creek Basin and one off-site basin. Flows will be detained to historic levels prior to exiting the site.

- Design Point JCD-B (Q_{10}=234.7, Q_{100}=333.52) is the basin south of Bradley Road, Basin JCD-1. The flow will enter a proposed detention pond where it will then release historic flows through a proposed culvert. The basin generates flows of 466.43 cfs and 744.19 cfs. A water quality feature will be required at this location. Preliminary Design has been included in the Appendix.

- Design Point JCD-C (Q_{10}=11.2, Q_{100}=16.8) is the basin located along Bradley Road, Basin JCD-2. Flows exit off site via a roadside ditch.

- Design Point JCD-D (Q_{10}=251.9, Q_{100}=296.8) is the basin north of Bradley Road, Basin JCD-3 and the offsite basin. It is assumed that the flow rate from the offsite basin remains the same, as the airport must detain to historic flows. The flow will enter a proposed detention pond where it will then release historic flows through a proposed culvert. The basin generates flows of 495.7 cfs and 692.1 cfs. A water quality feature will be required at this location. Preliminary Design has been included in the Appendix.

DETENTION PONDS

The original MDDP designed for Water Quality, but did not allow for any detention as at the time of that report, it had been assumed that the Big Johnson Reservoir would be able to detain any developed flows within the Big Johnson Basin of the site. Due to new regulations which have since been passed, this is no longer the case and development within the Big Johnson basin must be detained to Historic levels.

To satisfy this requirement, detention ponds for Filings No. 5 , No. 6 and No. 7 have been designed and will release flows at or below historic levels. The final details of these ponds are being designed within the FDR's for each filing and the preliminary calculations are included in the appendix.

Basins BJ-100 and BJ-200 are 2 basins from the original MDDP. These basins consisted of mostly open space, with minor development and were delineated by the proposed Powers Blvd on the west, east and north and the Big Johnson Reservoir on the south. The new sketch plan does not plan for any development within these 2 basins currently. As long as this remains true, these basins will continue to release at historic levels in to the reservoir, however if any development occurs within either of these basins, detention and water quality will need to be addressed.

There are 2 locations where flows cross under Powers Blvd and enter into Basin BJ-200. Due to the restrictions of not releasing any more than historic flows, these two crossings have detentions ponds

upstream and will release at or below the historic rates and do not contribute any additional flows into this basin. Due to these facilities, Basin BJ-200 does not need to detain any flows.

Filings No. 3, 4 and a portion of Filing No. 5 are within the Windmill Gulch Basin. A detention pond was built with Filing No. 3 that detains flows from all of this portion of the development. However, there is still a future commercial site located to the east of Filing No. 3 which does not drain to this pond. The future commercial site will need to design and construct it's own detention and water quality facility as it develops. A preliminary design has been included in the appendix for this feature.

With these filings all being detained to release at historic levels, the existing box at Grinnell Blvd (8' x 6' concrete box) should be adequate to handle historic flows.

Summary

The overall drainage patterns within the Waterview development located in the Windmill Gulch Basin have not changed. No new hydrology has been done, however copies of the detailed calculations from the FDR's in this area have been included in the appendix for reference. Due to new regulations regarding detention and water quality, several detention ponds have been added to the development site. Preliminary calculations have been included in the appendix and final design has or will be done as the various Filings develop.

Development within the site is to be commercial/retail, industrial and residential. Approximately 1/3 of the site is within the Big Johnson Basin. There are two proposed crossings under Powers Boulevard; each of these crossings will have a detention pond just upstream to ensure that flows are being released at historic rates, as the Big Johnson Reservoir is not able to accept developed flows.

The Jimmy Camp Basins will have two locations where flows are being released. Each of these locations will have a detention pond to ensure only historic flows are being released offsite.

REFERENCE MATERIALS

1. "City of Colorado Springs/El Paso County Drainage Criteria Manual" September 1987, Revised November 1991, Revised October 1994.

2. Master Development Drainage Plan for Waterview, May 2006. Prepared by Merrick & Co.

3. "Big Johnson Reservoir/Crews Gulch Drainage Basin Planning Study", Kiowa Engineering Corporation, September 1991.

4. Soils Survey of El Paso County Area, Natural Resources Conservation Services of Colorado.

5. Flood Insurance Rate Study for El Paso County, Colorado and Incorporated Areas. Federal Emergency Management Agency, Revised March 17, 1997.

6. "City of Colorado Springs/El Paso County Drainage Criteria Manual, Volume 2: Stormwater Quality Policies, Procedures and Best Management Practices" November 1, 2002.

7. "Final Drainage Report for Painted Sky at Waterview Filings No. 1 and No. 2" January 2007. Prepared by Merrick & Co.

8. “Final Drainage Report for Painted Sky at Waterview Filing No. 3” July, 2011, Revised March 2012. Prepared by Springs Engineering.

9. “Painted Sky at Waterview Phase II Preliminary Plan Amendment, Preliminary Drainage Report & Painted Sky at Waterview Filing No. 4 Final Drainage Report” August 2012. Prepared by Springs Engineering.

10. “Painted Sky at Waterview Filing No. 5 Final Drainage Report” May 31, 2013. Prepared by Springs Engineering.

11. “Painted Sky at Waterview Filing No. 6 Final Drainage Report” November 19, 2013. Prepared by Springs Engineering.

Figure 1: Vicinity Map

Figure 2: Proposed Drainage Map

Appendix A: Excerpts from Filing No. 1 & No. 2 FDR

Appendix B: Hydrology Calculations from Filing No. 3 to No.7

Appendix C: Detention Pond & Water Quality Calculations

Appendix D: Culvert Calculations

Appendix E: Excerpts from Previous Reports for Big Johnson Basin

Appendix F: Excerpts from Previous Reports for Jimmy Camp Basin