

Preliminary and Final Drainage Report

for

Clear View Properties I, LLC Clear View Industrial Park Filing No. 2A

Prepared for:
**El Paso County Planning and
Community Development Department**
2880 International Circle, Suite 110
Colorado Springs, CO 80910
(719) 520-6300



On Behalf of:
Clear View Properties I, LLC
9720 Arroya Lane
Colorado Springs, CO 80908
(719) 337-3534

Prepared by:
CTR Engineering, Inc.
16392 Timber Meadow Drive
Colorado Springs, CO 80908

June 2020

PCD Filing No.:
CDR208

Certification Statement

This report and plan for the final drainage design of Clear View Industrial Park Filing No. 2A was prepared by me (or under my direct supervision) in accordance with the provisions of El Paso County Drainage Design and Technical Criteria for the owners thereof. I understand that El Paso County does not and will not assume liability for drainage facilities designed by others.

SIGNATURE: _____
Registered Professional Engineer State of Colorado No. 34944

Clear View Properties I, LLC hereby certifies that the drainage facilities for Clear View Industrial Park Filing No. 2A shall be constructed according to the design presented in this report. I understand that El Paso County does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that El Paso County reviews drainage plans pursuant to Colorado Revised Statutes, Title 30, Article 28; but cannot, on behalf of Clear View Industrial Park Filing No. 2A guarantee that final drainage design review will absolve Clear View Properties I, LLC and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

Kevin Ferguson, Owner
Clear View Properties I, LLC

Authorized Signature

Filed in accordance with Section 51.1 of the El Paso Land Development Code, as amended.

Director of Public Works

Date

Conditions:

Table of Contents

I. General Location and Description	1
A. Location	
B. Description of property	
II. Drainage Basins and Sub-basins	2
A. Major basin descriptions	
B. Sub-basin description	
III. Drainage Design Criteria	2
A. Development criteria reference	
B. Hydrologic criteria	
IV. Drainage Facility Design	2
A. General concept	
B. Specific details	
C. Other government agency requirements	
D. Municipal Separate Storm Sewer System (MS4)	
V. Conclusion	5

Appendix

Rational Method Spreadsheets
Water Quality Spreadsheet
Storm Pipe Flow Calc's
Swale Calc's
IDF Curve
Runoff Coefficient
Soils Report

Maps

FEMA Floodplain Map
Existing Site Plan
Proposed Site Grading Plan
Drainage Plan

Missing, not attached

I. General Location and Description

A. Location

An industrial subdivision, Clear View Industrial Park Filing No. 2A, is in Security, CO on Clear View Loop, approximately a quarter mile southwest of intersection of Milton E. Proby Parkway and Hancock Expressway.

A portion of the eastern half of the east half of the section 2, Township 15 south, range 66 west of the 6th P.M., of the City of Colorado Springs, County of El Paso, State of Colorado, shows no major drainageways or facilities existing near the site, with the exception of the Fountain Mutual Canal, which is west of the site.

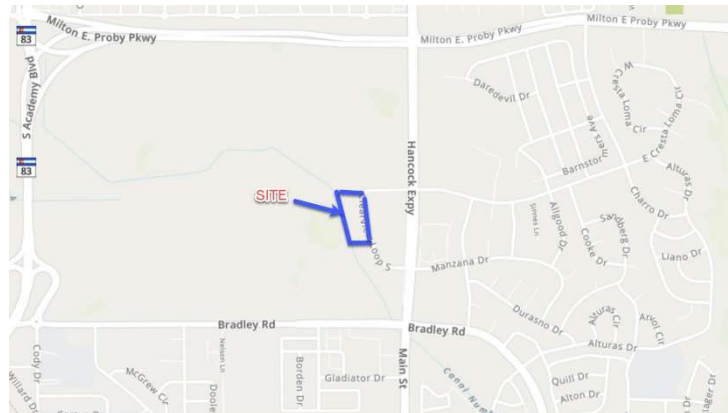
Names of surrounding platted developments:

North – New Sunshine, LLC, a commercial/industrial building

South – Clear View Industrial Park Filing No. 1

East - Clear View Industrial Park Filing No. 1

West – Security Water and Wastewater District, agriculture ground



B. Description of property

The 2.7+/- acre site consists of 4 platted lots approved in 2008. Lot 3A contains an existing building and earthen storage yard. Lot 4A will contain the water quality pond for lots 1-3 and will not have any structures built on it. Ground cover consists of bare ground and native grasses; and lot 3A contains some existing trees and shrubs. General topography directs all storm runoff in a westerly direction towards the Fountain Mutual Canal. General soil is Blakeland loamy sand with a Hydrologic Soil Group (HSG) of A.



No major drainageways exist on-site or adjacent to the property. No irrigation facilities exist on-site, but when lots 1A and 2A develop, they will most likely install irrigation systems for on-site landscaped areas. Lot 3A contains private utility service lines, and there is an existing Security Water and Wastewater District sanitation line running along the western property boundary; however, that line has been abandoned. Normal public utilities run within the Clear View Loop right-of-way.

II. Drainage Basins and Sub-basins

A. Major basin descriptions

There is no major drainage basin existing on this small site. Per the flood insurance map 08041C0763G, dated 12/7/2018, no floodplains or irrigation facilities exist on-site.

B. Sub-basin description

Historically, drainage flows have sheet flowed undetained in a westerly direction to the Fountain Mutual Canal. No off-site drainage patterns affect this site.

III. Drainage Design Criteria

A. Development criteria reference

The rational method was used to determine storm runoff flows, as found in the City of Colorado Springs Drainage Criteria Manual Volume 1. The water quality pond design is based on the Mile High Flood District, February 2020 spreadsheet. No master plans exist for this subdivision. No deviations are being requested. A previous drainage study by Classic Engineering, Inc., dated 2008, was submitted with the original subdivision plat. However, that drainage report designed individual water quality ponds per lot; that design is no longer being considered.

B. Hydrologic criteria

Design rainfall was calculated using the Colorado Springs Intensity Frequency Curve, found in the Appendix of this report. Runoff calculations used a weighted imperviousness for the entire site, based on percent imperviousness per lot, in order to create the overall runoff coefficient for the Rational Method. The 5-year and 100-year storm recurrence intervals were used to calculate peak runoff flows to design the storm and swale systems. Detention discharge and storage calculations were completed by the Mile High Flood District, with the Colorado Springs rainfall data inserted into the spreadsheet. Detention discharge will be via a concrete box with a flow limiting orifice plate. An emergency overflow weir has also been designed for any flows that exceed the 100-year storm event or pond volume capacity.

IV. Drainage Facility Design

A. General concept

No off-site runoff flows will exist on the entire site. All storm flows will be intercepted by proposed swales and directed to proposed storm pipes that will carry the storm water to the water quality pond. Flow will be directed in a northerly direction. The drainage plan in the Appendix of this report shows all proposed topo, swales, storm pipes, and water quality pond. The water quality pond (Full Spectrum Detention) has been designed with: 1.) a forebay, 2.) Water Quality Capture Volume (WQCV), 3.) Excess Urban Runoff Volume (EURV) and 4.) the 100-year storm event. See Appendix for all hydraulic tables and calculations. The Flowmaster program was also used to determine swale and storm pipe flow capacities.

B. Specific details

No off-site flows will affect this site or the proposed storm collection system, or water quality treatment pond. El Paso County does have street flows from Clear View Loop, which flow through a drainage swale on the southern property line to Fountain Mutual Canal.

A hydraulic soil group of “B” was used with the sizing of the water quality pond for conservative design approach. Also, the following table outlines other conservative design approach parameters that were used in the design:

Extra Storage Capacity in the Detention Facility				
Items	Min. Requirements	Provided	Excess	Comments
Total Site Imperviousness	56%	60%	4%	60% was used in the Mile High Flood District spreadsheet
Lots 1A and 2A Imperviousness	70%	85%	15%	70% imperviousness is recommended for Industrial Subdivisions. Each lot site development plan will determine the overall imperviousness of that lot.
Detention Pond Min. Bottom Surface (sf)	3699	4552	853	Extra pond foot print
Total Detention Volume (cu-ft)	12937	17155	4218	Extra Volume

The following are existing and proposed hydrologic conditions for the site:

Composite "C" Values (Existing)

Basin	Design Point	Area**	Area	Impervious Area	Pervious Area	% Imper.	5 Comp.	100 Comp	Q(100) (cfs)
		(Sq. Ft.)	(Acres)	(Sq. Ft.)	(Sq. Ft.)	%	"C"	"C"	
Lot 1A		21,796	0.50	-	21,796	0%	0.25	0.35	1.6
Lot 2A		21,827	0.50	-	21,827	0%	0.25	0.35	1.6
Lot 3A		43,447	1.00	30,500	12,947	70%	0.71	0.77	6.9
Lot 4A		33,455	0.77	-	33,455	0%	0.25	0.35	2.4
Onsite Totals		120,525	2.767	30,500	90,025	25%	0.41	0.50	12.5

Composite "C" Values (Proposed)

Basin	Design Point	Area**	Area	Impervious Area	Pervious Area	% Imper.	5 Comp.	100 Comp	Q(100) (cfs)
		(Sq. Ft.)	(Acres)	(Sq. Ft.)	(Sq. Ft.)	%	"C"	"C"	
Lot 1A		21,796	0.50	18,526	3,270	85%	0.80	0.86	3.9
Lot 2A		21,827	0.50	18,552	3,275	85%	0.80	0.86	3.9
Lot 3A		43,447	1.00	30,500	12,947	70%	0.71	0.77	6.9
Lot 4A		33,455	0.77	-	33,455	0%	0.25	0.35	2.4
Combined (Lots 1A-3A)	Forebay	87,070	2.00	67,578	19,492	78%	0.75	0.82	14.8
Onsite Totals		120,525	2.767	67,578	52,947	56%	0.61	0.69	17.1

There will be no impacts on existing storm facilities from the construction of the water quality and storm system for this site. On the contrary, this development will help the storm runoff conditions, as current storm runoff flow directly into the Fountain Mutual Canal, without any water quality or detention.

HDPE pipe will be used in the construction of the storm system, along with a modified CDOT Type “C” concrete box as the outlet structure. Nyloplast inlets will also be used. Riprap will be used at various places around the site to minimize erosion. The storm pipe system has been aligned at the lower end of lots 1A and 2A to capture runoff and direct it to the water quality pond.

No drainage impacts on streets or utilities are found, therefore, no additional work is required for this development. All storm pipes have been designed to carry the 100-year storm event flows. No environmental features exist on-site.

Maintenance access will be off Clear View Drive, with an accessible drive lane down to the bottom of the water quality pond. An 8-foot wide bench has also been provided around the western edge of the water quality pond.

The full spectrum detention pond design calculations were completed, using the Mile High Flood District spreadsheet, and can be found in the Appendix of this report. No reservoir routing is required with this development. All hydrology and hydraulic calculations can also be found in the Appendix.

The storm facility cost estimate can be found in the Appendix of this report. The calculated private cost estimate is \$60,732. The property owner already posted approximately \$60,000 back in 2008 and has installed the silt fence and the traffic pad. We propose that no other financial assurances will be required at this time.

All drainage fees and bridge fees were paid with the final plat, recorded in 2008; no fees are due at this time.

C. Other government agency requirements

The Fountain Mutual Ditch Company will need to review and approve the storm outfall for this project, as well as the Security Water and Wastewater District, with no additional outside government agencies needing to review this application.

D. Municipal Separate Storm Sewer System (MS4)

Stormwater quality protection is a very high priority within El Paso County. The following steps outline how this project is incorporating water quality features into its' design and construction:

Step 1: Employ Runoff Reduction Practices

This development will utilize one entire industrial lot for water quality and will not construct any impervious surfaces within that lot. Lots 1A and 2A will be encouraged to utilize inverted landscaped islands to help reduce the runoff volumes. Lot 3A is utilizing a gravel parking area, instead of asphalt. Trees and vegetation along the outside of the property will remain untouched.

Step 2: Implement Best Management Practices (BMP), which provide water quality capture volume, with a slow release.

This development will utilize an Extended Detention Basin (EDB) water quality pond that will slowly release the minor storm event. The entire site will be designed to drain to the EDB facility.

Step 3: Stabilize Drainageways

Currently this development drains uncontrolled storm flows to the Fountain Mutual Canal. With the construction of the EDB, storm flows will now be able to settle sediment particles out and control the release rate of major storm events. The outfall design will follow recommendation from the Fountain Mutual Canal company for channel protection.

Step 4: Implement Site Specific and Other Source Control BMPs

Structural BMPs that will be used during this project include: 1.) concrete forebay, 2.) concrete outlet box that will release storm flows over a 40-hour period, 3.) concrete micro pool, 4.) silt fence, 5) drainage swales to direct water to the storm pipe system, and 6.) riprap to prevent erosion from the swales to the storm pipe flared-end section.

All disturbed areas will be seeded and mulched. No site watering will be used, as the seeding mix will be native grasses and plants. Erosion blankets for 3:1 slopes and erosion logs, within the swales, will be laid. Final stabilization will occur by placing erosion blankets, seeding, and mulching. Lot 3A is already developed, lot 4A will contain only the water quality pond and lots 1A and 2A will develop once they are sold. Long-term stormwater management will be achieved by the development of lots 1A and 2A and by following the IM Plan for the Extended Detention Basin Water Quality Pond.

V. Conclusion

There is no current storm runoff water quality facilities for this development. The grading and the storm and erosion control application will provide full spectrum detention for this site. Current storm events run directly into Fountain Mutual Canal with no water quality or detention. Construction of these improvements will help the County with their commitment to provide water quality to all projects within the region.

Appendix