MVE, Inc.

September 24, 2019 PCD File No. MS198

comments provided on page 2 and proposed conditions drainage map.

El Paso County
Development Services - Engineering Division
2880 International Circle, Suite 110
Colorado Springs, CO 80910

Attn: Engineering Review

Re: Drainage Report for Wolff Run Estates
Project No. 61105

Engineering Review Team:

This Drainage Letter Report for Wolff Run Estates has been prepared in accordance with Section 4.5 Small Subdivision Drainage Report Format of the Drainage Criteria Manual for the City of Colorado Springs & El Paso County, Colorado. Said Report is in support of the proposed Minor Subdivision Platting of Wolff Run Estates located at 2030 Old Northgate Road, El Paso County Assessor's schedule number 6204000016, El Paso County, Colorado. The letter and enclosed hydrologic calculations are concerned with the existing and developed storm water runoff from the site which will remain relatively unchanged.

General property description is that the site is composed of 9.70 acres. The proposed Minor Subdivision is bounded by Old Northgate Road at the southern edge of the site. A **Vicinity Map** has been included for readers reference. The site borders Lots 7 & 8, Overlook Estates on the west; Lot 2, Timberedge Subdivision on the northeast; Lot 1, Block 2, Sun Hills Subdivision No.1 on the north; and two un-platted tracts on the eastern side.

The proposed Minor Subdivision is situate in two major drainage basins. The major drainage basin division line lies in the upper 1/4 of the proposed Minor Subdivision. Smith Creek Drainage Basin is situate to the northwest composing 1.78 +/- acres and Monument Branch Drainage Basin is situate to the southeast composing 7.92+/- acres of the total acreage of the entire proposed Minor Subdivision. On-site flows from the area of the proposed Minor Subdivision within the Smith Creek Drainage Basin exit the proposed Minor Subdivision along a portion of the northern and western boundary. Off-site storm water flows enter the proposed Minor Subdivision along the majority of the eastern boundary from sub-basins of the Monument Branch Drainage Basin. These sub-basins are bounded on the north by Timberedge Lane and on the east by Roller Coaster Road. The **Existing Drainage Map** has been included for readers reference.

The Smith Creek Drainage portion of the site generally slopes northerly and westerly at an average rate of 6-8 percent (%). This portion of the site consists of native grass. The Monument Branch Drainage Basin portion of the site generally slopes southwesterly with the northerly portion sloping at 12% blending into the southerly portion of the site at a 5% a slope. This portion of the site contains a single family residence with a detached garage, an animal barn, and out-structures. The existing house and garage which are accessed via a gravel driveway with an existing 24" CM pipe at the connection to Old

Engineers • Surveyors
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Northgate Road. The area not covered by the buildings and pavement has been considered to have pasture/meadow surface characteristics.

General existing drainage characteristics of the site will not change due to the platting and residential development. The minor increases in storm runoff from the site negligible and will nave no discernible effect on the property or adjacent properties. An **Existing Drainage Map** and **Developed Drainage Map** are included in the appendix of this report for reference of existing and proposed drainage basins and table listing of basin areas and flows. All offsite flows remain unchanged with no indication of adverse effects from storm water flows.

Basin A-1, having an area of 0.58 acres and draining onto the property to the north, will remain the same as existing conditions because no construction is likely in that basin. Runoff discharges from Basin A-1 will remain unchanged at Q_5 = 0.2 cfs and Q_{100} = 1.6 cfs. Basin B-1, having an area of 1.46 acres and draining offsite to the northwest, will have a negligible increase in developed storm water flows because of the future house and drive to be constructed. The increase in developed conditions is Q_5 = 0.3 cfs and Q_{100} = 0.4 cfs, which is negligible an of no effect. Basin C-1, having an area of 0.51 acres and draining onto the property to the east, will remain the same as existing conditions because no construction is likely in that basin. Runoff discharges from Basin C-1 will remain unchanged at Q_5 = 0.2 cfs and Q_{100} = 1.3 cfs. Basin D-1, having an area of 6.48 acres, drains offsite to the southwest and will have a minor increase in storm runoff in the developed condition due to new lot construction and re-development of the existing southerly residence. The minor increase for the basin is 0.7 cfs in the 5-year rainfall event and 0.8 cfs in the 100-year event. Design Point DP1 consists of the combination of offsite basin OB-1, Basin C-1 and Basin D-1. These combined flows exit the west boundary of the site and drain into the property on the west. The increases at DP1 are Q_5 = 0.5 cfs and Q_{100} = 0.7 cfs. These increases are negligible and of no effect downstream. Basin E-1, having an area of 0.48 acres and draining southwest to old Northgate Road, will remain the same as existing conditions as no significant changes are likely to occur in this basin. Runoff discharges from Basin E-1 will remain unchanged at Q_5 = 0.1 cfs and Q_{100} = 1.0 cfs. Design Point DP2 consists of the combination of flows from offsite basins OB-1, OB-2, OB-3 as well as basins C-1, D-1 and E-1. These flows combine in the ditch on the north side of Old North Gate Road and continue west in the ditch. The increase for the flows at DP-2 are negligible at 0.6 cfs in the 5-year rainfall event and 0.6 cfs in the 100-year event. According to drainage mapping prepared for the Flying Horse Ranch Master Development Drainage Plan prepared by Classic Consulting Engineers & Surveyors, Revised December 2003, runoff from said on-site and off-site basins after exiting the proposed subdivision flow westerly in the existing Old Northgate Road northerly borrow ditch. Field observation indicate no adverse effects from storm water flows in said northerly borrow ditch. These ditch flows continue to 2 - 42" RC Pipes installed under Old Northgate Road west of this property approximately 1600 feet. Our analysis indicates these pipes will accept 144 cubic f
flow. The Flying Horse Master Development Drainage Plan indicates
collected and piped from this point. Because of the large lot rural
Wolff Run Estates, The increase in developed flows due to the sub
Storm detention of these flows not required.

Development of this lot should "not have any adverse impact on the adjacent downstream lots". flow should be directed in such a way as to not allow or create any adverse impacts. Please state this in this report.

The current Flood Insurance Study of the region includes the F
effective December 7, 2018. The project site is included in Map Num
El Paso County, Colorado. According to the FIRM, the subject site is not included in a FEMA designated Special Flood Hazard Area (SFHA). A portion of the current FIRM (Flood Insurance Rate Map) with the site delineated is included with this report.

According to the Soil Survey of El Paso County Area, Colorado by the United States Natural Resource Conservation Service, the soil of the site is Tomah-Crowfoot complex (map unit 93), which is part of

hydrologic soil group B. The Tomah-Crowfoot soil is Sandy and Sandy Loam and well drained. A portion of the **Soil Survey Map** is included with this report.

Hydrologic analysis for both existing and developed conditions of the site were performed according to the Rational Method. Q = CAi where:

Q = Peak runoff rate in cubic feet per second (cfs)

C = Runoff coefficient

i = average rainfall intensity in inches per hour

A = drainage area in acres

Analysis was completed in accordance with said Drainage Criteria Manual for the City of Colorado Springs & El Paso County, Colorado. Peak runoff flow rates were calculated for the 5-year and 100-year rainfall recurrence intervals for both existing and future developed conditions. A new drive splitting to two new homes have been used for the developed future conditions.

Drainage Maps are included for readers reference denoting direction and quantities of storm water flows entering, crossing and leaving the site for both existing and future developed conditions. The same drainage basin configurations have been used for both existing and proposed future developed conditions. The increase for the proposed future developed conditions is minimal and constitutes an increase of Q_5 = 0.6 cfs and Q_{100} = 0.9 cfs. More specifically, no adverse impacts are foreseen downstream from these minimal insignificant developed storm water flow increases.

The El Paso County Engineering Criteria Manual (Appendix I, Section I.7.2) requires the consideration of a "Four Step Process for receiving water protection that focuses on reducing runoff volumes, treating the water quality capture volume (WQCV), stabilizing drainage ways, and implementing long term source controls". The Four Step Process is incorporated in this project and the elements are discussed below.

1) Runoff Reduction Practices are employed in this project by maintaining impervious surfaces to the lowest amount practically possible. The disturbed areas next to the single house and driveway construction will be re-vegetated. The majority of site will remain as pervious surface.
2) All drainage paths on the site are stabilized and not expected to be disturbed. Any disturbed area will be stabilized with appropriate re-vegetation.
3) The project contains no potentially hazardous uses. No WQCV BMP's will be required with the development of the site because the lots are greater than 2.5 acres in area and meets the exclusion criteria for large lot single family sites as found in Engineering Criteria Manual Section I.7.B.5.
4) The site contains no storage of potentially harmful substances or use of potentially harmful substances. No Site Specific or Other Source Control BMP's will be required.

The site is situated in two Drainage Basins. The Monument Branch Drainage Basin and the Smith Creek Drainage Basin both with their receiving waters being Monument Creek. The Monument Branch Drainage Basin, El Paso Basin Number FOMO3800 was last studied in 1987. Fees associated with this Basin are a Drainage Fee of $18,350 per impervious acre. There are no Bridge Fees. The Monument Branch Drainage Basin portion of Wolff Run Estates contains 7.92 acres of land. Reductions in the per

acre Drainage Fee are allowed pursuant to El Paso County Resolution 99-383. A fee reduction in the of 25% for lots 2.5 acres or larger and the use of a 7% impervious factor for lots 2.5 acres or larger. This brings the Drainage Fee to $963.38 per acre which equals a total drainage fee of $7,629.93 for 7.92 acres of land.

The Smith Creek Drainage Basin of Monument Creek, El Paso Basin Number FOMO4000 was last studied in 1996. Fees associated with this Basin are a Drainage Fee of $7,481 per impervious acre and a Bridge Fee of $1,004 per impervious acre. The Smith Creek Drainage Basin portion of Wolff Run Estates contains 1.78 acres of land. Reductions in the per acre Drainage Fee are allowed pursuant to El Paso County Resolution 99-383. A fee reduction in the of 25% for lots 2.5 acres or larger and the use of a 7% impervious factor for lots 5 acres or larger. This brings the Drainage Fee to $392.75 per acre which equals a total Drainage Fee of $699.10 and the Bridge Fee to $52.71 per acre which equals a total Bridge Fee of $93.82 for the 1.78 acres of land.

This Drainage Report Letter is prepared in accordance with the requirements of El Paso County for the approval of the proposed Wolff Run Estates. The are no proposed public improvements and with the future addition of a single family residence there is only minimal increase in storm water peak flow with all drainage patterns remaining the substantially the same as existing conditions. The development of the proposed use will cause no adverse impacts to adjacent properties or downstream drainage ways.

Very truly yours,

M.V.E., Inc.

Charles C. Crum P.E.,

Charles C. Crum, P.E. CO 13348
CCC:sh
Enc.
Z:\61105\Documents\Reports\61105 Drainage Letter Report.odt

STATEMENTS AND ACKNOWLEDGEMENTS

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 El Paso County for drainage reports and said report is in conformity with the 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.

Charles C. Crum, P.E. 7-2-19

Charles C. Crum, P.E. Colorado No. 13348 Date
For and on Behalf of M.V.E., Inc.

Developer's Statement

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

_____ _____

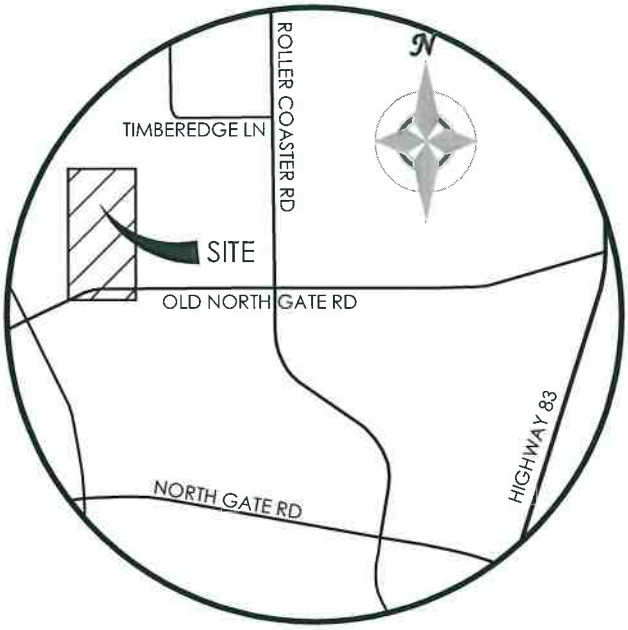
Gregory S. Wolff, Owner Date
14050 Roller Coaster Road
Colorado Springs, CO 80921

El Paso County

Filed in accordance with Drainage Criteria Manual, Volumes 1 & 2, El Paso County Engineering Criteria Manual and land Development Code as amended.

_____ _____

County Engineer / ECM Administrator Date
El Paso County



VICINITY MAP

NOT TO SCALE

Soil Map—El Paso County Area, Colorado

Map Scale: 1:2,430 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 16, Sep 10, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 4, 2010—Oct 16, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
93	Tomah-Crowfoot complex, 8 to 15 percent slopes	11.2	100.0%
Totals for Area of Interest		**11.2**	**100.0%**

Hydrologic Soil Group—El Paso County Area, Colorado

Map Scale: 1:2,430 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

Aerial Photography

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The soil surveys that comprise your AOI were mapped at 1:24,000.

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Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
93	Tomah-Crowfoot complex, 8 to 15 percent slopes	B	11.2	100.0%
Totals for Area of Interest			**11.2**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Job No.: 61105
Project: Pony Tracks II

Date: 9/24/2019 14:53
Calcs By: ASM
Checked By:

Time of Concentration (Modified from Standard Form SF-1)

Sub-Basin	Sub-Basin Data				Overland			Shallow Channel				Channelized				t_c Check		
	Area (Acres)	C_5	C_{100}/CN	% Imp.	L_0 (ft)	S_0 (%)	t_i (min)	L_{0t} (ft)	S_{0t} (ft/ft)	v_{0sc} (ft/s)	t_t (min)	L_{0c} (ft)	S_{0c} (ft/ft)	v_{0c} (ft/s)	t_c (min)	L (min)	$t_{c,alt}$ (min)	t_c (min)
Existing																		
A	0.58	0.08	0.35	0%	100	19%	7.0	0	0.000	0.0	0.0	0	0.000	0.0	0.0	1	N/A	7.0
B	1.45	0.08	0.35	0%	100	6%	10.2	190	0.079	2.0	1.6	0	0.000	0.0	0.0	290	N/A	11.8
C	0.51	0.08	0.35	0%	100	15%	7.5	170	0.141	2.6	1.1	0	0.000	0.0	0.0	270	N/A	8.6
D	6.48	0.10	0.36	3%	100	20%	6.7	270	0.111	2.3	1.9	767	0.061	5.0	2.5	1137	N/A	11.2
E	0.48	0.08	0.35	0%	100	6%	10.2	300	0.050	1.6	3.2	70	0.029	1.9	0.6	470	N/A	14.0
Offsite																		
OB-1	11.85	0.09	0.36	2%	100	6%	10.1	300	0.083	2.0	2.5	1030	0.056	5.5	3.1	1430	N/A	15.7
OB-2	12.67	0.09	0.36	1%	100	9%	8.9	290	0.103	2.3	2.1	1589	0.057	5.6	4.8	1979	N/A	15.8
OB-3	16.04	0.10	0.36	2%	100	12%	8.0	165	0.085	2.0	1.3	1335	0.046	5.6	4.0	1600	N/A	13.3
OB-4	1.20	0.08	0.35	0%	100	2%	14.7	200	0.020	1.0	3.4	1082	0.054	2.9	6.3	1382	N/A	24.3
Proposed																		
A-1	0.58	0.08	0.35	0%	100	19%	7.0	0	0.000	0.0	0.0	0	0.000	0.0	0.0	1	N/A	7.0
B-1	1.45	0.13	0.39	8%	100	6%	9.7	190	0.079	2.0	1.6	0	0.000	0.0	0.0	290	N/A	11.3
C-1	0.51	0.08	0.35	0%	100	15%	7.5	170	0.141	2.6	1.1	0	0.000	0.0	0.0	270	N/A	8.6
D-1	6.48	0.12	0.38	6%	100	20%	6.6	270	0.111	2.3	1.9	767	0.061	5.1	2.5	1137	N/A	11.0
E-1	0.48	0.08	0.35	0%	100	6%	10.2	300	0.050	1.6	3.2	70	0.029	1.9	0.6	470	N/A	14.0

Job No.: **61105**
Project: Pony Tracks II
Design Storm: **5-Year Storm** *(20% Probability)*
Jurisdiction: **DCM**

Date: **9/24/2019 14:53**
Calcs By: **ASM**
Checked By:

Sub-Basin and Combined Flows (Modified from Standard Form SF-2)

				Direct Runoff				Combined Runoff				Streetflow			Pipe Flow					Travel Time		
DP	Sub-Basin	Area (Acres)	C5	t_c (min)	CA (Acres)	I5 (in/hr)	Q5 (cfs)	t_c (min)	CA (Acres)	I5 (in/hr)	Q5 (cfs)	Slope (%)	Length (ft)	Q (cfs)	Q (cfs)	Slope (%)	Mnngs n	Length (ft)	D_{Pipe} (in)	Length (ft)	v_{Osc} (ft/s)	t_t (min)
Existing																						
	A	0.58	0.08	7.0	0.05	4.67	0.2															
	B	1.45	0.08	11.8	0.12	3.88	0.5															
	C	0.51	0.08	8.6	0.04	4.35	0.2															
	D	6.48	0.10	11.2	0.63	3.96	2.5															
	E	0.48	0.08	14.0	0.04	3.62	0.1															
Offsite																						
	OB-1	11.85	0.09	15.7	1.08	3.45	3.7															
	OB-2	12.67	0.09	15.8	1.11	3.45	3.8															
	OB-3	16.04	0.10	13.3	1.54	3.70	5.7															
	OB-4	1.20	0.08	24.3	0.10	2.80	0.3															
EX DP1	OB1,C1,D1	18.84	0.09					17.5	1.75	3.29	5.8											
EX DP2	OB1-3,C1,D1,E1	48.03	0.09					16.1	4.43	3.41	15.1											
EX DP3	OB-4	1.20	0.08					24.3	0.10	2.80	0.3											
Proposed																						
	A-1	0.58	0.08	7.0	0.05	4.67	0.2															
	B-1	1.45	0.13	11.3	0.19	3.95	0.8															
	C-1	0.51	0.08	8.6	0.04	4.35	0.2															
	D-1	6.48	0.12	11.0	0.79	3.99	3.2															
	E-1	0.48	0.08	14.0	0.04	3.62	0.1															
Offsite																						
	OB-1	11.85	0.09	15.7	1.08	3.45	3.7															
	OB-2	12.67	0.09	15.8	1.11	3.45	3.8															
	OB-3	16.04	0.10	13.3	1.54	3.70	5.7															
	OB-4	1.20	0.08	24.3	0.10	2.80	0.3															
DP1	OB1,C1,D1	18.84	0.10					17.5	1.91	3.29	6.3											
DP2	OB1-3,C1,D1,E1	48.03	0.10					16.1	4.59	3.41	15.7											
DP3	OB-4	1.20	0.08					24.3	0.10	2.80	0.3											

DCM: I = C1 * ln (tc) + C2
C1: 1.5
C1: 7.583

Job No.: 61105
Project: Pony Tracks II
Design Storm: 100-Year Storm *(1% Probability)*
Jurisdiction: DCM

Date: 9/24/2019 14:53
Calcs By: ASM
Checked By:

Sub-Basin and Combined Flows (Modified from Standard Form SF-2)

				Direct Runoff				Combined Runoff				Streetflow			Pipe Flow					Travel Time		
DP	Sub-Basin	Area (Acres)	C100	t_c (min)	CA (Acres)	I100 (in/hr)	Q100 (cfs)	t_c (min)	CA (Acres)	I100 (in/hr)	Q100 (cfs)	Slope (%)	Length (ft)	Q (cfs)	Q (cfs)	Slope (%)	Mnngs n	Length (ft)	D_{Pipe} (in)	Length (ft)	v_{0sc} (ft/s)	t_t (min)
Existing																						
	A	0.58	0.35	7.0	0.20	7.84	1.6															
	B	1.45	0.35	11.8	0.51	6.51	3.3															
	C	0.51	0.35	8.6	0.18	7.31	1.3															
	D	6.48	0.36	11.2	2.34	6.65	15.6															
	E	0.48	0.35	14.0	0.17	6.08	1.0															
Offsite																						
	OB-1	11.85	0.36	15.7	4.24	5.80	24.6															
	OB-2	12.67	0.36	15.8	4.50	5.79	26.0															
	OB-3	16.04	0.36	13.3	5.79	6.21	36.0															
	OB-4	1.20	0.35	24.3	0.42	4.70	2.0															
EX DP1	OB1,C1,D1	18.84	0.36					17.5	6.77	5.52	37.3											
EX DP2	OB1-3,C1,D1,E	48.03	0.36					16.1	17.23	5.73	98.7											
EX DP3	OB-4	1.20	0.35					24.3	0.42	4.70	2.0											
Proposed																						
	A-1	0.58	0.35	7.0	0.20	7.84	1.6															
	B-1	1.45	0.39	11.3	0.56	6.63	3.7															
	C-1	0.51	0.35	8.6	0.18	7.31	1.3															
	D-1	6.48	0.38	11.0	2.46	6.69	16.4															
	E-1	0.48	0.35	14.0	0.17	6.08	1.0															
Offsite																						
	OB-1	11.85	0.36	15.7	4.24	5.80	24.6															
	OB-2	12.67	0.36	15.8	4.50	5.79	26.0															
	OB-3	16.04	0.36	13.3	5.79	6.21	36.0															
	OB-4	1.20	0.35	24.3	0.42	4.70	2.0															
DP1	OB1,C1,D1	18.84	0.37					17.5	6.88	5.52	38.0											
DP2	OB1-3,C1,D1,E	48.03	0.36					16.1	17.34	5.73	99.3											
DP3	OB-4	1.20	0.35					24.3	0.42	4.70	2.0											

DCM: I = C1 * ln (tc) + C2
C1: 2.52
C1: 12.735

Sub-Basin A Runoff Calculations (EX)

Job No.:	61105	Date:	9/24/2019 14:53
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	Runoff Coefficient C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	25,474	0.58	0.02	0.08	0.15	0.25	0.3	0.35	0%
Combined	**25,474**	**0.58**	**0.02**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**	**0.0%**

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$: 300 ft C_v: 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	1	19	-	-	-	-	
Initial Time	100	19	0.190	-	7.0	N/A	DCM Eq. 6-8
Shallow Channel			0.000	0.0	0.0	-	DCM Eq. 6-9
Channelized			0.000	0.0	0.0	-	V-Ditch
				t_c	**7.0 min.**		

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	3.72	4.67	5.45	6.23	7.01	7.84
Runoff (cfs)	0.0	**0.2**	0.5	0.9	1.2	**1.6**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.0	**0.2**	0.5	0.9	1.2	**1.6**
DCM: I = C1 * ln (tc) + C2						
C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin B Runoff Calculations (EX)

Job No.:	61105	Date:	9/24/2019 14:53
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	63,308	1.45	0.02	0.08	0.15	0.25	0.3	0.35	0%
	-	0.00							
Combined	**63,308**	**1.45**	**0.02**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**	**0.0%**

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$ 300 ft C_v 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	290	21	-	-	-	-	
Initial Time	100	6	0.060	-	10.2	N/A	DCM Eq. 6-8
Shallow Channel	190	15	0.079	2.0	1.6	-	DCM Eq. 6-9
Channelized			0.000	0.0	0.0	-	V-Ditch
				t_c	**11.8 min.**		

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	3.10	3.88	4.53	5.17	5.82	6.51
Runoff (cfs)	0.1	**0.5**	1.0	1.9	2.5	**3.3**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.1	**0.5**	1.0	1.9	2.5	**3.3**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin C Runoff Calculations (EX)

Job No.:	61105	Date:	9/24/2019 14:53
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	22,143	0.51	0.02	0.08	0.15	0.25	0.3	0.35	0%
	-	0.00							
Combined	**22,143**	**0.51**	**0.02**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**	**0.0%**

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$ 300 ft C_v 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	270	39	-	-	-	-	
Initial Time	100	15	0.150	-	7.5	N/A	DCM Eq. 6-8
Shallow Channel	170	24	0.141	2.6	1.1	-	DCM Eq. 6-9
Channelized			0.000	0.0	0.0	-	V-Ditch
				t_c	**8.6 min.**		

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	3.47	4.35	5.08	5.80	6.53	7.31
Runoff (cfs)	0.0	**0.2**	0.4	0.7	1.0	**1.3**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.0	**0.2**	0.4	0.7	1.0	**1.3**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.533	8.847	10.111	11.375	12.735

Notes

Sub-Basin D Runoff Calculations (EX)

Job No.:	61105	Date:	9/24/2019 14:53
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	273,750	6.28	0.02	0.08	0.15	0.25	0.3	0.35	0%
Roofs	3,300	0.08	0.71	0.73	0.75	0.78	0.8	0.81	90%
Gravel	5,200	0.12	0.57	0.59	0.63	0.66	0.68	0.7	80%
Combined	**282,250**	**6.48**	**0.04**	**0.10**	**0.17**	**0.26**	**0.31**	**0.36**	**2.5%**

282250

Basin Travel Time

-

Shallow Channel Ground Cover Short Pasture/Lawns

$L_{max,Overland}$ 300 ft C_v 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	1,137	97	-	-	-	-	
Initial Time	100	20	0.200	-	6.7	N/A	DCM Eq. 6-8
Shallow Channel	270	30	0.111	2.3	1.9	-	DCM Eq. 6-9
Channelized	767	47	0.061	5.0	2.5	-	V-Ditch
				t_c	**11.2 min.**		

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	3.16	3.96	4.62	5.28	5.94	6.65
Runoff (cfs)	0.8	**2.5**	5.0	9.0	12.0	**15.6**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.8	**2.5**	5.0	9.0	12.0	**15.6**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin E Runoff Calculations (EX)

Job No.:	61105	Date:	9/24/2019 14:53
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	21,019	0.48	0.02	0.08	0.15	0.25	0.3	0.35	0%
	-	0.00							
Combined	**21,019**	**0.48**	**0.02**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**	**0.0%**

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$ 300 ft C_v 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	470	23	-	-	-	-	
Initial Time	100	6	0.060	-	10.2	N/A	DCM Eq. 6-8
Shallow Channel	300	15	0.050	1.6	3.2	-	DCM Eq. 6-9
Channelized	70	2	0.029	1.9	0.6	-	V-Ditch
				t_c	**14.0 min.**		

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.89	3.62	4.23	4.83	5.44	6.08
Runoff (cfs)	0.0	**0.1**	0.3	0.6	0.8	**1.0**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.0	**0.1**	0.3	0.6	0.8	**1.0**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin OB-1 Runoff Calculations (Offsite)

Job No.:	61105	Date:	9/24/2019 14:53
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	Runoff Coefficient C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	507,442	11.65	0.02	0.08	0.15	0.25	0.3	0.35	0%
Roofs	8,903	0.20	0.71	0.73	0.75	0.78	0.8	0.81	90%
Combined	**516,345**	**11.85**	**0.03**	**0.09**	**0.16**	**0.26**	**0.31**	**0.36**	**1.6%**

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$: 300 ft C_v: 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	1,430	89	-	-	-	-	
Initial Time	100	6	0.060	-	10.1	N/A	DCM Eq. 6-8
Shallow Channel	300	25	0.083	2.0	2.5	-	DCM Eq. 6-9
Channelized	1,030	58	0.056	5.5	3.1	-	V-Ditch
				t_c	**15.7 min.**		

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.76	3.45	4.03	4.61	5.18	5.80
Runoff (cfs)	1.0	**3.7**	7.7	14.1	19.0	**24.6**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	1.0	**3.7**	7.7	14.1	19.0	**24.6**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.647	10.111	11.375	12.735

Notes

Sub-Basin OB-2 Runoff Calculations (Offsite)

Job No.:	61105	Date:	9/24/2019 14:53
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	Runoff Coefficient C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	545,604	12.53	0.02	0.08	0.15	0.25	0.3	0.35	0%
Roofs	6,155	0.14	0.71	0.73	0.75	0.78	0.8	0.81	90%
Combined	**551,759**	**12.67**	**0.03**	**0.09**	**0.16**	**0.26**	**0.31**	**0.36**	**1.0%**

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$ 300 ft C_v 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	1,979	129	-	-	-	-	
Initial Time	100	9	0.090	-	8.9	N/A	DCM Eq. 6-8
Shallow Channel	290	30	0.103	2.3	2.1	-	DCM Eq. 6-9
Channelized	1,589	90	0.057	5.6	4.8	-	V-Ditch
				t_c	**15.8 min.**		

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.75	3.45	4.02	4.60	5.17	5.79
Runoff (cfs)	1.0	**3.8**	8.0	14.9	20.0	**26.0**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	1.0	**3.8**	8.0	14.9	20.0	**26.0**
DCM: I = C1 * ln (tc) + C2						
C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin OB-3 Runoff Calculations (Offsite)

Job No.:	61105	Date:	9/24/2019 14:53
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	Runoff Coefficient C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	681,512	15.65	0.02	0.08	0.15	0.25	0.3	0.35	0%
Roofs	17,091	0.39	0.71	0.73	0.75	0.78	0.8	0.81	90%
Combined	**698,603**	**16.04**	**0.04**	**0.10**	**0.16**	**0.26**	**0.31**	**0.36**	**2.2%**

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$ 300 ft C_v 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	1,600	88	-	-	-	-	
Initial Time	100	12	0.120	-	8.0	N/A	DCM Eq. 6-8
Shallow Channel	165	14	0.085	2.0	1.3	-	DCM Eq. 6-9
Channelized	1,335	62	0.046	5.6	4.0	-	V-Ditch
				t_c	**13.3 min.**		

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.96	3.70	4.32	4.94	5.55	6.21
Runoff (cfs)	1.7	**5.7**	11.4	20.8	27.8	**36.0**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	1.7	**5.7**	11.4	20.8	27.8	**36.0**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.736

Notes

Sub-Basin OB-4 Runoff Calculations (Offsite)

Job No.:	61105	Date:	9/24/2019 14:53
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	Runoff Coefficient C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	52,426	1.20	0.02	0.08	0.15	0.25	0.3	0.35	0%
	-	0.00							
Combined	**52,426**	**1.20**	**0.02**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**	**0.0%**

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$: 300 ft C_v: 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	1,382	64	-	-	-	-	
Initial Time	100	2	0.020	-	14.7	N/A	DCM Eq. 6-8
Shallow Channel	200	4	0.020	1.0	3.4	-	DCM Eq. 6-9
Channelized	1,082	58	0.054	2.9	6.3	-	V-Ditch
				t_c	**24.3 min.**		

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.24	2.80	3.26	3.73	4.20	4.70
Runoff (cfs)	0.1	**0.3**	0.6	1.1	1.5	**2.0**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.1	**0.3**	0.6	1.1	1.5	**2.0**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Combined Sub-Basin DP1 Runoff Calculations (Existing)

Includes Basins OB-1 C D

Job No.:	61105	Date:	9/24/2019 15:03
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	Runoff Coefficient C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	803,335	18.44	0.02	0.08	0.15	0.25	0.3	0.35	0%
Roofs	12,203	0.28	0.71	0.73	0.75	0.78	0.8	0.81	90%
Gravel	5,200	0.12	0.57	0.59	0.63	0.66	0.68	0.7	80%
Combined	**820,738**	**18.84**	**0.03**	**0.09**	**0.16**	**0.26**	**0.31**	**0.36**	**1.8%**

Basin Travel Time

	Sub-basin or Channel Type	Material Type	L (ft)	Elev. ΔZ_0 (ft)	Q_i (cfs)	Base or Dia (ft)	Sides z:1 (ft/ft)	v (ft/s)	t (min)
Furthest Reach	OB-1	-	1,430	89	-	-	-	-	15.7
Channelized-1	V-Ditch	2	615	30	25	0	2	5.6	1.8
Channelized-2									
Channelized-3									
Total			2,045	119					

2 = Natural, Winding, minimal vegetation/shallow grass

t_c (min) **17.5**

Contributing Offsite Flows (Added to Runoff and Allowed Release, below.)

Contributing Basins/Areas

Q_{Minor} (cfs) - 5-year Storm

Q_{Major} (cfs) - 100-year Storm

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.63	3.29	3.84	4.38	4.93	5.52
Site Runoff (cfs)	1.67	**5.75**	11.70	21.51	28.79	**37.33**
OffSite Runoff (cfs)	-	**0.00**	-	-	-	**0.00**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	-	**5.8**	-	-	-	**37.3**

DCM I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Runoff from Offsite basins have been assumed constant, despite additional times of concentration.

Combined Sub-Basin DP2 Runoff Calculations (Existing)

Includes Basins OB-1 OB-2 OB-3 C D E

Job No.:	61105	Date:	9/24/2019 15:03
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	Runoff Coefficient C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	2,051,470	47.10	0.02	0.08	0.15	0.25	0.3	0.35	0%
Roofs	35,449	0.81	0.71	0.73	0.75	0.78	0.8	0.81	90%
Gravel	5,200	0.12	0.57	0.59	0.63	0.66	0.68	0.7	80%
Combined	**2,092,119**	**48.03**	**0.03**	**0.09**	**0.16**	**0.26**	**0.31**	**0.36**	**1.7%**

Basin Travel Time

	Sub-basin or Channel Type	Material Type	L (ft)	Elev. ΔZ_0 (ft)	Q_i (cfs)	Base or Dia (ft)	Sides z:1 (ft/ft)	v (ft/s)	t (min)
Furthest Reach	OB-2	-	1,979	129	-	-	-	-	15.8
Channelized-1	V-Ditch	1	135	3	26	0	2	6.2	0.4
Channelized-2									
Channelized-3									
Total			2,114	132					

1 = Man-made, Smooth, Straight

t_c (min) **16.1**

Contributing Offsite Flows (Added to Runoff and Allowed Release, below.)

Contributing Basins/Areas

Q_{Minor} (cfs) - 5-year Storm

Q_{Major} (cfs) - 100-year Storm

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.73	3.41	3.98	4.55	5.12	5.73
Site Runoff (cfs)	4.33	**15.13**	30.86	56.83	76.09	**98.69**
OffSite Runoff (cfs)	-	**0.00**	-	-	-	**0.00**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	-	**15.1**	-	-	-	**98.7**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Runoff from Offsite basins have been assumed constant, despite additional times of concentration.

Combined Sub-Basin DP3 Runoff Calculations (Existing)

Includes Basins OB-4

Job No.:	61105	Date:	9/24/2019 15:03
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	Runoff Coefficient C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	52,426	1.20	0.02	0.08	0.15	0.25	0.3	0.35	0%
Roofs	-	0.00	0.71	0.73	0.75	0.78	0.8	0.81	90%
Gravel	-	0.00	0.57	0.59	0.63	0.66	0.68	0.7	80%
Combined	**52,426**	**1.20**	**0.02**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**	**0.0%**

Basin Travel Time

	Sub-basin or Channel Type	Material Type	L (ft)	Elev. ΔZ_0 (ft)	Q_i (cfs)	Base or Dia (ft)	Sides z:1 (ft/ft)	v (ft/s)	t (min)
Furthest Reach	OB-4	-	1,382	64	-	-	-	-	24.3
Channelized-1									
Channelized-2									
Channelized-3									
Total			1,382	64					
								t_c (min)	24.3

Contributing Offsite Flows (Added to Runoff and Allowed Release, below.)

Contributing Basins/Areas

Q_{Minor} (cfs) - 5-year Storm

Q_{Major} (cfs) - 100-year Storm

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.24	2.80	3.26	3.73	4.20	4.70
Site Runoff (cfs)	0.05	**0.27**	0.59	1.12	1.52	**1.98**
OffSite Runoff (cfs)	-	**0.00**	-	-	-	**0.00**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	-	**0.3**	-	-	-	**2.0**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Runoff from Offsite basins have been assumed constant, despite additional times of concentration.

Sub-Basin A-1 Runoff Calculations (Proposed)

Job No.:	61105	Date:	9/24/2019 14:53
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	25,474	0.58	0.02	0.08	0.15	0.25	0.3	0.35	0%
	-	0.00							
Combined	**25,474**	**0.58**	**0.02**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**	**0.0%**

Basin Travel Time

Shallow Channel Ground Cover Short Pasture/Lawns

$L_{max,Overland}$ 300 ft C_v 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	1	19	-	-	-	-	
Initial Time	100	19	0.190	-	7.0	N/A	DCM Eq. 6-8
Shallow Channel			0.000	0.0	0.0	-	DCM Eq. 6-9
Channelized			0.000	0.0	0.0	-	V-Ditch
				t_c	**7.0 min.**		

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	3.72	4.67	5.45	6.23	7.01	7.84
Runoff (cfs)	0.0	**0.2**	0.5	0.9	1.2	**1.6**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.0	**0.2**	0.5	0.9	1.2	**1.6**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin B-1 Runoff Calculations (Proposed)

Job No.:	61105	Date:	9/24/2019 14:53
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	Runoff Coefficient C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	57,308	1.32	0.02	0.08	0.15	0.25	0.3	0.35	0%
Gravel	3,500	0.08	0.57	0.59	0.63	0.66	0.68	0.7	80%
Roofs	2,500	0.06	0.71	0.73	0.75	0.78	0.8	0.81	90%
Combined	**63,308**	**1.45**	**0.08**	**0.13**	**0.20**	**0.29**	**0.34**	**0.39**	**8.0%**

63308

-

Basin Travel Time

Shallow Channel Ground Cover Short Pasture/Lawns

$L_{max,Overland}$ 300 ft C_v 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	290	21	-	-	-	-	
Initial Time	100	6	0.060	-	9.7	N/A	DCM Eq. 6-8
Shallow Channel	190	15	0.079	2.0	1.6	-	DCM Eq. 6-9
Channelized			0.000	0.0	0.0	-	V-Ditch
				t_c	**11.3 min.**		

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	3.15	3.95	4.61	5.27	5.93	6.63
Runoff (cfs)	0.4	**0.8**	1.3	2.2	2.9	**3.7**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.4	**0.8**	1.3	2.2	2.9	**3.7**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin C-1 Runoff Calculations (Proposed)

Job No.:	61105	Date:	9/24/2019 14:53
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	22,143	0.51	0.02	0.08	0.15	0.25	0.3	0.35	0%
	-	0.00							
Combined	**22,143**	**0.51**	**0.02**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**	**0.0%**

Basin Travel Time

Shallow Channel Ground Cover Short Pasture/Lawns

$L_{max,Overland}$ 300 ft C_v 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	270	39	-	-	-	-	
Initial Time	100	15	0.150	-	7.5	N/A	DCM Eq. 6-8
Shallow Channel	170	24	0.141	2.6	1.1	-	DCM Eq. 6-9
Channelized			0.000	0.0	0.0	-	V-Ditch
				t_c	**8.6 min.**		

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	3.47	4.35	5.08	5.80	6.53	7.31
Runoff (cfs)	0.0	**0.2**	0.4	0.7	1.0	**1.3**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.0	**0.2**	0.4	0.7	1.0	**1.3**
DCM: I = C1 * ln (tc) + C2						
C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin D-1 Runoff Calculations (Proposed)

Job No.:	61105	Date:	9/24/2019 14:53
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	261,050	5.99	0.02	0.08	0.15	0.25	0.3	0.35	0%
Roofs	7,500	0.17	0.71	0.73	0.75	0.78	0.8	0.81	90%
Gravel	13,700	0.31	0.57	0.59	0.63	0.66	0.68	0.7	80%
Combined	**282,250**	**6.48**	**0.07**	**0.12**	**0.19**	**0.28**	**0.33**	**0.38**	**6.3%**

282250

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Basin Travel Time

Shallow Channel Ground Cover Short Pasture/Lawns

$L_{max,Overland}$ 300 ft C_v 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	1,137	97	-	-	-	-	
Initial Time	100	20	0.200	-	6.6	N/A	DCM Eq. 6-8
Shallow Channel	270	30	0.111	2.3	1.9	-	DCM Eq. 6-9
Channelized	767	47	0.061	5.1	2.5	-	V-Ditch

t_c **11.0 min.**

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	3.18	3.99	4.65	5.32	5.98	6.69
Runoff (cfs)	1.3	**3.2**	5.7	9.8	12.9	**16.4**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	1.3	**3.2**	5.7	9.8	12.9	**16.4**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Sub-Basin E-1 Runoff Calculations (Proposed)

Job No.:	61105	Date:	9/24/2019 14:53
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	21,019	0.48	0.02	0.08	0.15	0.25	0.3	0.35	0%
	-	0.00							
Combined	**21,019**	**0.48**	**0.02**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**	**0.0%**

Basin Travel Time

Shallow Channel Ground Cover: Short Pasture/Lawns

$L_{max,Overland}$ 300 ft C_v 7

	L (ft)	ΔZ_0 (ft)	S_0 (ft/ft)	v (ft/s)	t (min)	t_{Alt} (min)	
Total	470	23	-	-	-	-	
Initial Time	100	6	0.060	-	10.2	N/A	DCM Eq. 6-8
Shallow Channel	300	15	0.050	1.6	3.2	-	DCM Eq. 6-9
Channelized	70	2	0.029	1.9	0.6	-	V-Ditch
				t_c	**14.0 min.**		

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.89	3.62	4.23	4.83	5.44	6.08
Runoff (cfs)	0.0	**0.1**	0.3	0.6	0.8	**1.0**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	0.0	**0.1**	0.3	0.6	0.8	**1.0**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.79	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Combined Sub-Basin DP1 Runoff Calculations (Proposed)

Includes Basins OB-1 C-1 D-1

Job No.:	61105	Date:	9/24/2019 14:53
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	Runoff Coefficient C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	790,635	18.15	0.02	0.08	0.15	0.25	0.3	0.35	0%
Roofs	16,403	0.38	0.71	0.73	0.75	0.78	0.8	0.81	90%
Gravel	13,700	0.31	0.57	0.59	0.63	0.66	0.68	0.7	80%
Combined	**820,738**	**18.84**	**0.04**	**0.10**	**0.17**	**0.27**	**0.32**	**0.37**	**3.1%**

Basin Travel Time

	Sub-basin or Channel Type	Material Type	L (ft)	Elev. ΔZ_0 (ft)	Q_i (cfs)	Base or Dia (ft)	Sides z:1 (ft/ft)	v (ft/s)	t (min)
Furthest Reach	OB-1	-	1,430	89	-	-	-	-	15.7
Channelized-1	V-Ditch	2	615	30	25	0	2	5.6	1.8
Channelized-2									
Channelized-3									
Total			2,045	119					

2 = Natural, Winding, minimal vegetation/shallow grass

t_c (min) **17.5**

Contributing Offsite Flows (Added to Runoff and Allowed Release, below.)

Contributing Basins/Areas

Q_{Minor} (cfs) - 5-year Storm

Q_{Major} (cfs) - 100-year Storm

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.63	3.29	3.84	4.38	4.93	5.52
Site Runoff (cfs)	2.13	**6.29**	12.29	22.09	29.39	**37.96**
OffSite Runoff (cfs)	-	**0.00**	-	-	-	**0.00**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	-	**6.3**	-	-	-	**38.0**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Runoff from Offsite basins have been assumed constant, despite additional times of concentration.

Combined Sub-Basin DP2 Runoff Calculations (Proposed)

Includes Basins OB-1 OB-2 OB-3 C-1 D-1 E-1

Job No.:	61105	Date:	9/24/2019 14:53
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	2,038,770	46.80	0.02	0.08	0.15	0.25	0.3	0.35	0%
Roofs	39,649	0.91	0.71	0.73	0.75	0.78	0.8	0.81	90%
Gravel	13,700	0.31	0.57	0.59	0.63	0.66	0.68	0.7	80%
Combined	**2,092,119**	**48.03**	**0.04**	**0.10**	**0.16**	**0.26**	**0.31**	**0.36**	**2.2%**

Basin Travel Time

	Sub-basin or Channel Type	Material Type	L (ft)	Elev. ΔZ_0 (ft)	Q_i (cfs)	Base or Dia (ft)	Sides z:1 (ft/ft)	v (ft/s)	t (min)
Furthest Reach	OB-2	-	1,979	129	-	-	-	-	15.8
Channelized-1	V-Ditch	1	135	3	26	0	2	6.2	0.4
Channelized-2									
Channelized-3									
Total			2,114	132					

1 = Man-made, Smooth, Straight

t_c (min) **16.1**

Contributing Offsite Flows (Added to Runoff and Allowed Release, below.)

Contributing Basins/Areas

Q_{Minor} (cfs) - 5-year Storm

Q_{Major} (cfs) - 100-year Storm

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.73	3.41	3.98	4.55	5.12	5.73
Site Runoff (cfs)	4.80	**15.68**	31.46	57.43	76.71	**99.34**
OffSite Runoff (cfs)	-	**0.00**	-	-	-	**0.00**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	-	**15.7**	-	-	-	**99.3**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Runoff from Offsite basins have been assumed constant, despite additional times of concentration.

Combined Sub-Basin DP3 Runoff Calculations (Proposed)

Includes Basins OB-4

Job No.:	61105	Date:	9/24/2019 14:53
Project:	Pony Tracks II	Calcs by:	ASM
		Checked by:	
Jurisdiction	DCM	Soil Type	B
Runoff Coefficient	Surface Type	Urbanization	Non-Urban

Basin Land Use Characteristics

Surface	Area (SF)	Area (Acres)	Runoff Coefficient C2	C5	C10	C25	C50	C100	% Imperv.
Pasture/Meadow	52,426	1.20	0.02	0.08	0.15	0.25	0.3	0.35	0%
Roofs	-	0.00	0.71	0.73	0.75	0.78	0.8	0.81	90%
Gravel	-	0.00	0.57	0.59	0.63	0.66	0.68	0.7	80%
Combined	**52,426**	**1.20**	**0.02**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**	**0.0%**

Basin Travel Time

	Sub-basin or Channel Type	Material Type	L (ft)	Elev. ΔZ_0 (ft)	Q_i (cfs)	Base or Dia (ft)	Sides z:1 (ft/ft)	v (ft/s)	t (min)
Furthest Reach	OB-4	-	1,382	64	-	-	-	-	24.3
Channelized-1									
Channelized-2									
Channelized-3									
Total			1,382	64					
								t_c (min)	**24.3**

Contributing Offsite Flows (Added to Runoff and Allowed Release, below.)

Contributing Basins/Areas

Q_{Minor} (cfs) - 5-year Storm

Q_{Major} (cfs) - 100-year Storm

Rainfall Intensity & Runoff

	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Intensity (in/hr)	2.24	2.80	3.26	3.73	4.20	4.70
Site Runoff (cfs)	0.05	**0.27**	0.59	1.12	1.52	**1.98**
OffSite Runoff (cfs)	-	**0.00**	-	-	-	**0.00**
Release Rates (cfs/ac)	-	-	-	-	-	-
Allowed Release (cfs)	-	**0.3**	-	-	-	**2.0**

DCM: I = C1 * ln (tc) + C2

C1	1.19	1.5	1.75	2	2.25	2.52
C2	6.035	7.583	8.847	10.111	11.375	12.735

Notes

Runoff from Offsite basins have been assumed constant, despite additional times of concentration.

EXISTING DRAINAGE SUMMARY TABLE

POINT OF INTEREST/ BASIN(S)		AREA (AC)	Tc (MIN.)	RUNOFF Q5 (CFS)	RUNOFF Q100 (CFS)
A		0.58	7.0	0.2	1.6
B		1.45	11.8	0.5	3.3
C		0.51	8.6	0.2	1.3
D		6.48	11.2	2.5	15.6
E		0.48	14.0	0.1	1.0
OB-1		11.85	15.7	3.7	24.6
OB-2		12.67	15.8	3.8	26.0
OB-3		16.04	13.3	5.7	36.0
OB-4		1.20	24.3	0.3	2.0
DP1	OB-1, C, D	18.84	17.5	5.8	37.3
DP2	OB-1,OB-2,OB-3,C,D,E	48.03	16.1	15.1	98.7
DP3	OB-4	1.20	24.3	0.3	2.0

LEGEND

PROPERTY LINE
EASEMENT LINE
LOT LINE

EXISTING

5985 INDEX CONTOUR
84 INTERMEDIATE CONTOUR

PROPOSED

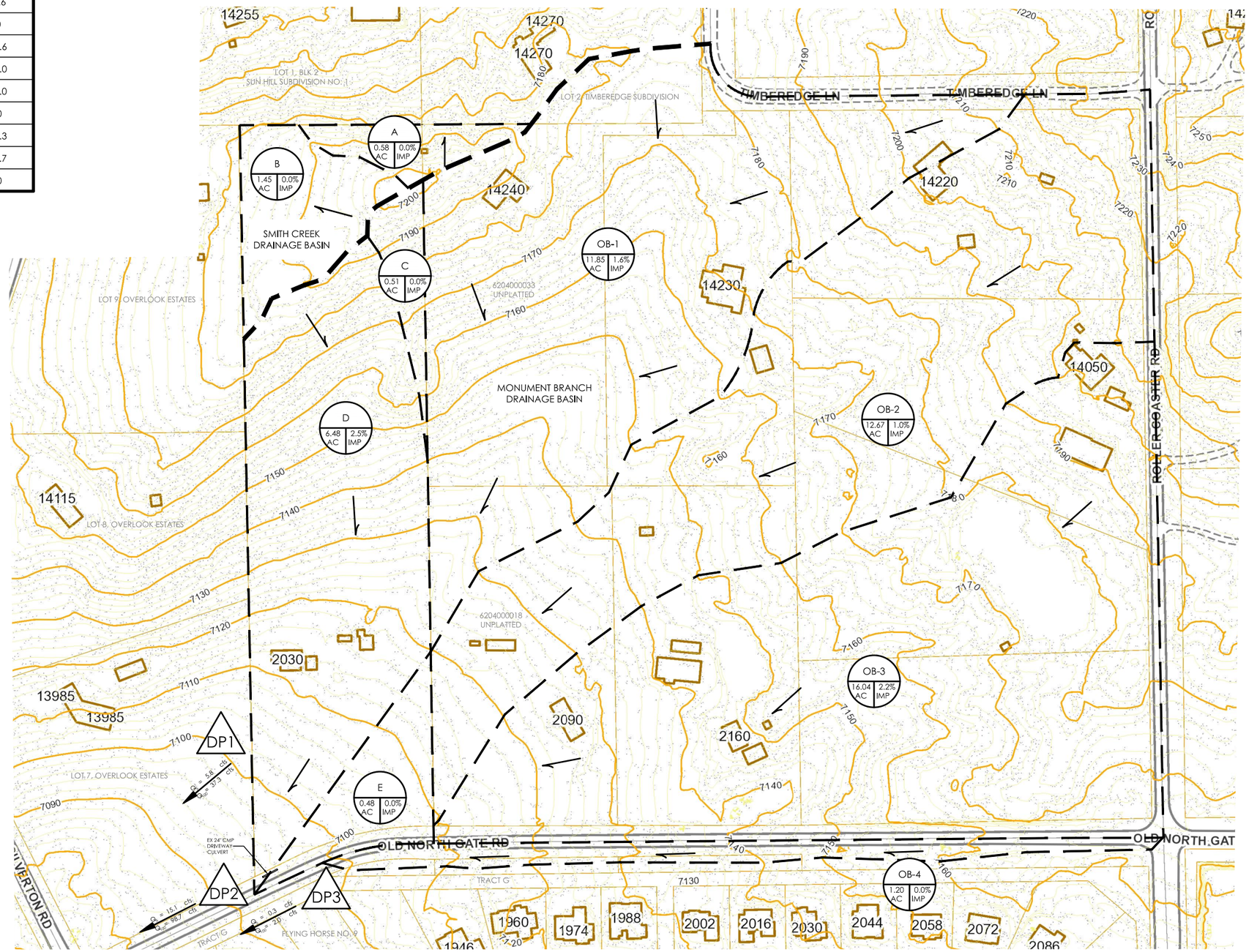
5985 INDEX CONTOUR
84 INTERMEDIATE CONTOUR
BASIN BOUNDARY
Q = 19.0 cfs, Q_{100} = 60.0 cfs — GENERAL FLOW/DIRECTION
1.5% — SLOPE DIRECTION AND GRADE
A1 — 1.0 AC, 50% IMP — BASIN LABEL: AREA IN ACRES, PERCENT IMPERVIOUS
1 — POINT OF INTEREST

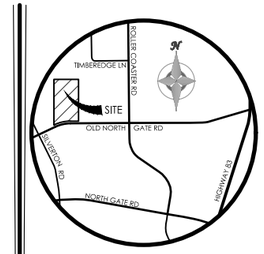
FLOODPLAIN STATEMENT:

NO PORTION OF THE SUBJECT PROPERTY IS LOCATED WITHIN A FEMA DESIGNATED SPECIAL FLOOD HAZARD AREA (SFHA) AS INDICATED ON THE FLOOD INSURANCE RATE MAP (FIRM) FOR EL PASO COUNTY, COLORADO AND INCORPORATED AREAS - MAP NUMBER 08041C0295 G, EFFECTIVE DECEMBER 7, 2018.

50 0 100 200 400

1" = 200' 1:2,400





VICINITY MAP
NOT TO SCALE

BENCHMARK

REVISIONS

MVE INC ENGINEERS & SURVEYORS
1903 lelaray street, suite 200 colorado springs, co 80909 719.635.5736

DESIGNED BY CCC JULY 2, 2019
DRAWN BY ASM JULY 2, 2019
CHECKED BY
AS-BUILTS BY
CHECKED BY

PONY TRACKS
SUBDIVISION FILING NO 2

EXISTING
DRAINAGE MAP

MVE PROJECT **61105**
MVE DRAWING **EX-DM**

September 24, 2019
SHEET 1 OF 1

DEVELOPED DRAINAGE SUMMARY TABLE

POINT OF INTEREST/ BASIN(S)		AREA (AC)	Tc (MIN.)	RUNOFF Q5 (CFS)	RUNOFF Q100 (CFS)
A-1		0.58	7.0	0.2	1.6
B-1		1.45	11.3	0.8	3.7
C-1		0.51	8.6	0.2	1.3
D-1		6.48	11.0	3.2	16.4
E-1		0.48	14.0	0.1	1.0
OB-1		11.85	15.7	3.7	24.6
OB-2		12.67	15.8	3.8	26.0
OB-3		16.04	13.3	5.7	36.0
OB-4		1.20	24.3	0.3	2.0
DP1	OB1, C1, D1,	18.84	17.5	6.3	38.0
DP2	OB-1,OB2,OB1-3,C1,D1,E1	48.03	16.1	15.7	99.3
EX3	OB-4	1.20	29.4	0.3	2.0

Please double check these values with the spread sheets provided in the report.

this should read DP 3

LEGEND

PROPERTY LINE
EASEMENT LINE
LOT LINE

EXISTING

5985 INDEX CONTOUR
84 INTERMEDIATE CONTOUR

PROPOSED

5985 INDEX CONTOUR
84 INTERMEDIATE CONTOUR
BASIN BOUNDARY
Q = 19.0 cfs, Q_{100} = 60.0 cfs GENERAL FLOW/DIRECTION
1.5% SLOPE DIRECTION AND GRADE
A1 | 1.0 AC | 50% IMP BASIN LABEL, AREA IN ACRES, PERCENT IMPERVIOUS
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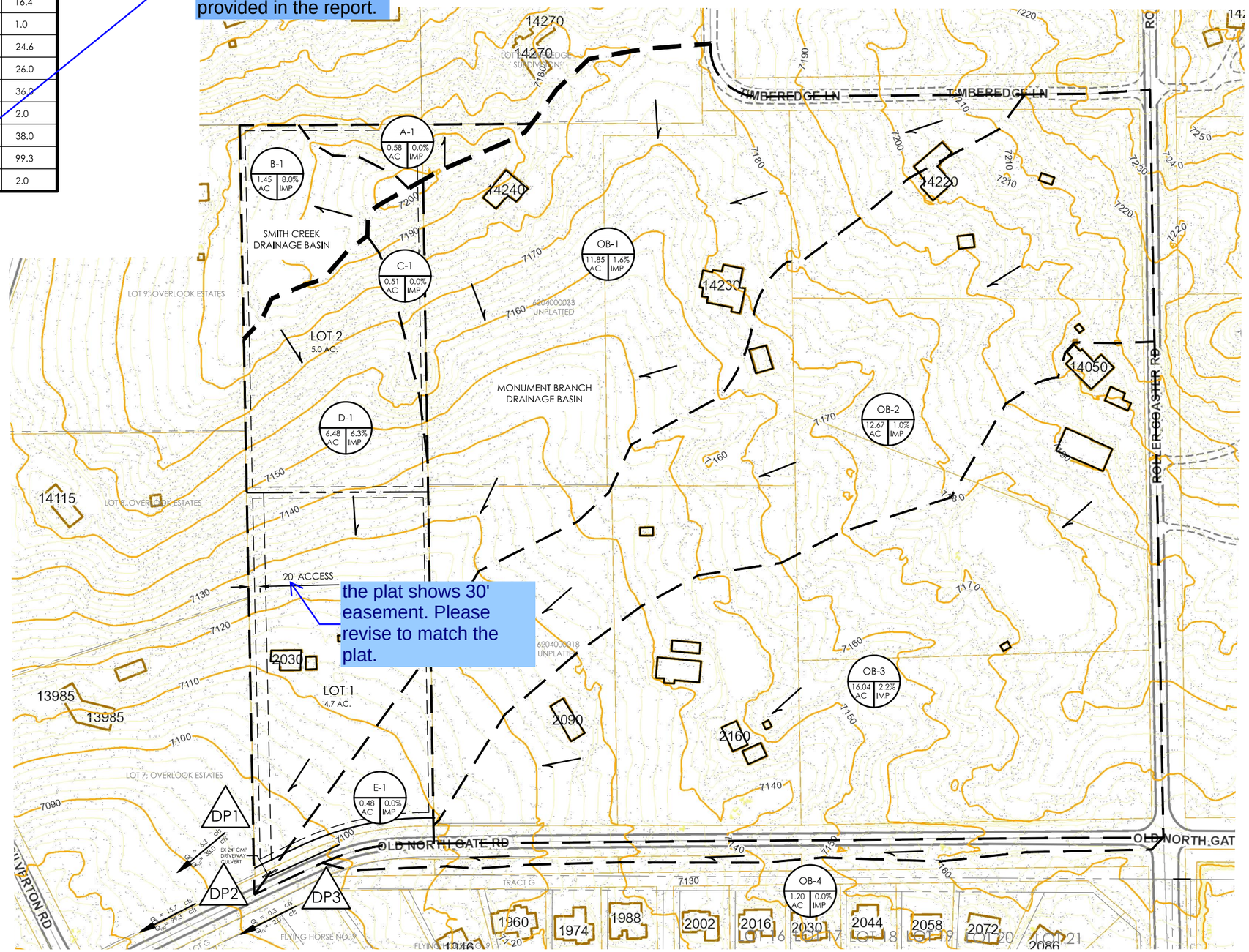
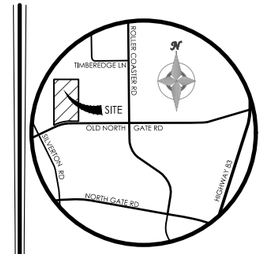




VICINITY MAP
NOT TO SCALE

BENCHMARK

REVISIONS

MVE INC ENGINEERS SURVEYORS
1903 lelaray street, suite 200 colorado springs, co 80909 719.635.5736

DESIGNED BY	CCC	JULY 2, 2019
DRAWN BY	ASM	JULY 2, 2019
CHECKED BY		
AS-BUILTS BY		
CHECKED BY		

PONY TRACKS
SUBDIVISION FILING NO 2

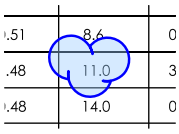
PROPOSED
DRAINAGE MAP

MVE PROJECT **61105**
MVE DRAWING **PP-DM**

September 24, 2019
SHEET 1 OF 1

Drainage Letter_v2_redlines.pdf Markup Summary

Engineer (8)



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Page Label: 38
Author: dsdnijkamp
Date: 10/21/2019 4:13:41 PM
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Color:
Layer:
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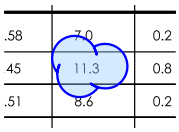

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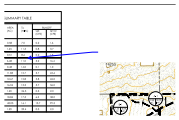

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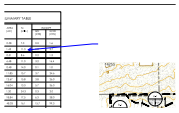

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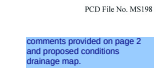

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Page Label: 1
Author: dsdnijkamp
Date: 10/21/2019 4:22:37 PM
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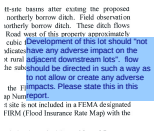
Space:

comments provided on page 2 and proposed conditions drainage map.

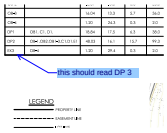


Subject: Engineer
Page Label: 2
Author: dsdnijkamp
Date: 10/21/2019 9:37:05 AM
Status:
Color:
Layer:
Space:

Development of this lot should "not have any adverse impact on the adjacent downstream lots". flow should be directed in such a way as to not allow or create any adverse impacts. Please state this in this report.

Subject: Engineer
Page Label: 38
Author: dsdnijkamp
Date: 10/21/2019 9:49:03 AM
Status:
Color:
Layer:
Space:

the plat shows 30' easement. Please revise to match the plat.



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Date: 10/21/2019 9:50:33 AM
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Layer:
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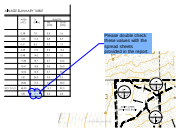
this should read DP 3

Group (1)



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Please double check these values with the spread sheets provided in the report.