



Sterling Design Associates, LLC

CIVIL ENGINEERS - LANDSCAPE ARCHITECTS

August 23, 2017

El Paso County  
2880 International Circle, Suite 110  
Colorado Springs, CO 80910

RE: Lot 2, Academy Gateway Subdivision, Filing No. 1  
Northgate & Struthers, El Paso County, CO  
Drainage Letter

Vertical Construction Management (VCM) is proposing a new restaurant within the Academy Gateway Subdivision, Filing No.1. The scope of the project will be to construct a new 2,200 sq. ft. restaurant with drive-thru pickup window and associated parking, drive, and landscape areas on a pad-ready site.

This project will be on Lot 2, Academy Gateway Subdivision Filing No. 1, which is 0.985 acres. The site is bound by Gleneagle Gate View (50.0 foot private R.O.W.), on the north, shared private drives on the west and south, and Struthers Road (120' R.O.W.) on the east. Lot 2 will be a vacant, pad-ready site that will be constructed by the overall developer with utilities stubbed to the site. The site will generally slope from north to south at approximately 1.0% to 5.0%.

The project area lies within Basins B and D, as defined by the *Preliminary / Final Drainage Report for Academy Gateway Subdivision Filing No. 1*, prepared by Classic Consulting Engineers & Surveyors, March 2017 (El Paso County Job No. SF-16-018). Basin D is 2.16 acres and is assumed to be 100% impervious per the Classic Consulting report. A copy of the drainage map from the *Preliminary / Final Drainage Report for Academy Gateway Subdivision Filing No. 1* has been provided in Appendix B.

It should be noted that the original Classic Consulting report did not account for the storm sewer stub to serve Lot 2. Classic Consultant has submitted a subsequent addendum to the approved Final Drainage Report, which now includes calculations and design for the storm sewer stub for Lot 2. The *Drainage Letter Addendum for Academy Gateway Subdivision Filing No. 1*, prepared by Classic Consulting, dated August 11, 2017 has been provided in Appendix C. The Drainage Letter addendum further divides the site into Basins B, D1, D2, and D4.

It should also be noted that the Classic Consulting report states that the detention facility in Tract C is temporary, and will be removed once the El Paso County Regional Facility is constructed southwest of the site. Although not explicitly stated in the drainage report for the overall development, it is our understanding that detention and water quality for Lot 2 will be provided by detention facility in Tract C, or by the El Paso County Regional Facility once it is constructed. Per discussion with the County, no water quality features are proposed or will be required on Lot 2, since water quality will be handled by detention facility in Tract C, or the regional facility.

The proposed development on Lot 2 will consist of roughly five onsite basins as depicted by the drainage plan in Appendix D:

- Basin A-1 (0.33 acres, 69% impervious) consists of parking, drive, patio and landscape areas and will drain to a proposed inlet in the southeast corner of the site where runoff will be conveyed via storm sewer to the detention facility in Tract C (design point 1).
- Basin A-2 (0.19 acres, 73% impervious) consists of parking, drive, and landscape areas and will drain to a proposed inlet in the southwest corner of the site where runoff will be conveyed via storm sewer to the detention facility in Tract C (design point 2).

Jay M. Newell, PE  
Wayne T. Sterling, RLA, LEED AP

2009 W. Littleton Blvd. #300  
Littleton, CO 80120

303.794.4727  
www.SterlingDesignAssociates.com

PPR 17-030



- Basin R-1 (0.05 acres, 90% impervious) consists of roof area for the proposed restaurant and will drain to proposed storm sewer along the south edge of Lot 2 and ultimately to the detention facility in Tract C (design point 2).
- Basin O-1 (0.32 acres, 44% impervious) consists of the north portion of the shared access drive south of the site, a portion of the south access point, and landscape areas in the south and east portions of the site. Due to grading constraints and the design of the internal access roads and storm sewer systems, runoff from Basin O-1 cannot be conveyed to the detention facility in Tract C. Runoff from Basin O-1 will drain to the private access drive south of the site where it will continue to the east to Struthers Road. (design point 3).
- Basin O-2 (0.10 acres, 47% impervious) consists of the east portion of the shared access drive west of the site, and landscape areas in the west portion of the site. Due to grading and layout constraints, this basin cannot be conveyed to the storm sewer system in Lot 2 and will ultimately outfall to Gleneagle Gate View. Runoff from Basin O-2 will be conveyed via curb and gutter and storm sewer in Gleneagle Gate View to the detention facility within Tract C (design point 4).

Proposed development on Lot 2 complies with the drainage concept outlined in the Classic Consulting report and subsequent addendum. Proposed development on Lot 2 will total approximately 60% impervious, which is significantly less than the 100% impervious assumed in the Classic Consulting report. As such, the proposed development is in conformance with El Paso County drainage criteria.

Sincerely,

Joe Schiel, PE  
For and on behalf of  
Sterling Design Associates, LLC

Attachments (3):

- Appendix A - Tributary Basin and Percent Impervious Calculations
- Appendix B - Selected Drainage Map from Academy Gateway Subdivision Filing No. 1 Drainage Report
- Appendix C – Drainage Letter Addendum for Academy Gateway Subdivision Filing No. 1
- Appendix D - Drainage Plan

Jay M. Newell, PE  
Wayne T. Sterling, RLA, LEED AP

2009 W. Littleton Blvd. #300  
Littleton, CO 80120

303.794.4727  
[www.SterlingDesignAssociates.com](http://www.SterlingDesignAssociates.com)

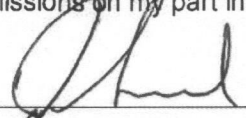


## Drainage Letter Signature Blocks



### Design Engineer's Statement:

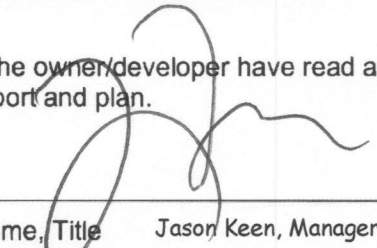
The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the applicable 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.

  
Name, P.E. # Joseph schiel, #48332

10/3/2017  
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.

  
Name, Title      Jason Keen, Manager  
Business Name    VRE Northgate, LLC.  
Address            1211 South White Chapel Blvd.  
                         Southlake, TX 76092

10/16/17

Date

### 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.

**Approved**  
  
By: Jennifer Irvine, County Engineer  
Date: **10/26/2017**  
County Engineer / ECM Administrator  
El Paso County Department of Public Works

Date

**Jay M. Newell, PE**  
**Wayne T. Sterling, RLA, LEED AP**

2009 W. Littleton Blvd. #300  
Littleton, CO 80120

303.794.4727  
www.SterlingDesignAssociates.com



# Appendix A

## Tributary Basin and Percent Impervious Calculations

Jay M. Newell, PE  
Wayne T. Sterling, RLA, LEED AP

2009 W. Littleton Blvd. #300  
Littleton, CO 80120

303.794.4727  
[www.SterlingDesignAssociates.com](http://www.SterlingDesignAssociates.com)



## Weighted Imperviousness

Job Name: Starbucks, Northgate & Struthers, El Paso County, CO

Date: 5/16/17

By: JGS

	<sup>1</sup> I (%)	<sup>1</sup> C <sub>5</sub>	<sup>1</sup> C <sub>10</sub>	<sup>1</sup> C <sub>100</sub>
Roof	90	0.73	0.75	0.81
Lawn	0	0.08	0.15	0.35
Drives & Walks	100	0.90	0.92	0.96

<sup>1</sup>City of Colorado Springs Drainage Criteria Manual, Volume 1, May 2014

### PROPOSED SITE

Basin	Roof (sf)	Lawn (sf)	Drives & Walks (sf)	Total (sf)	Total (ac)	I (%)	C <sub>5</sub>	C <sub>10</sub>	C <sub>100</sub>
A-1	0	4489	9791	14280	0.33	69	0.64	0.68	0.77
A-2	0	2214	5911	8125	0.19	73	0.68	0.71	0.79
R-1	2257	0	0	2257	0.05	90	0.73	0.75	0.81
O-1	0	7824	6045	13869	0.32	44	0.44	0.49	0.62
O-2	0	2327	2049	4376	0.10	47	0.46	0.51	0.64
Total Site	2,257	16,854	23,796	42,907	0.99	60	0.57	0.61	0.71

<sup>2</sup>Assumed square footages from aerial documentation

<sup>3</sup>Assumed square footage of future development



## Stormwater Runoff - 5 Year

Job Name: Starbucks, Northgate & Struthers, El Paso County, CO

Calculated by: JGS

Design Storm: 5-yr

[illegible]

<sup>1</sup>City of Colorado Springs Drainage Criteria Manual, Volume 1, May 2014

<sup>2</sup>Intensity from City of Colorado Springs Drainage Criteria Manual, Volume 1, May 2014

<sup>3</sup>5-Minute Time of Concentration Conservatively Assumed



Job Name: Starbucks, Northgate & Struthers, El Paso County, CO

Calculated by: JGS

Design Storm: 100-yr

<sup>1</sup>City of Colorado Springs Drainage Criteria Manual, Volume 1, May 2014  
<sup>2</sup>Intensity from City of Colorado Springs Drainage Criteria Manual, Volume 1, May 2014  
<sup>3</sup>5-Minute Time of Concentration Conservatively Assumed



## Appendix B

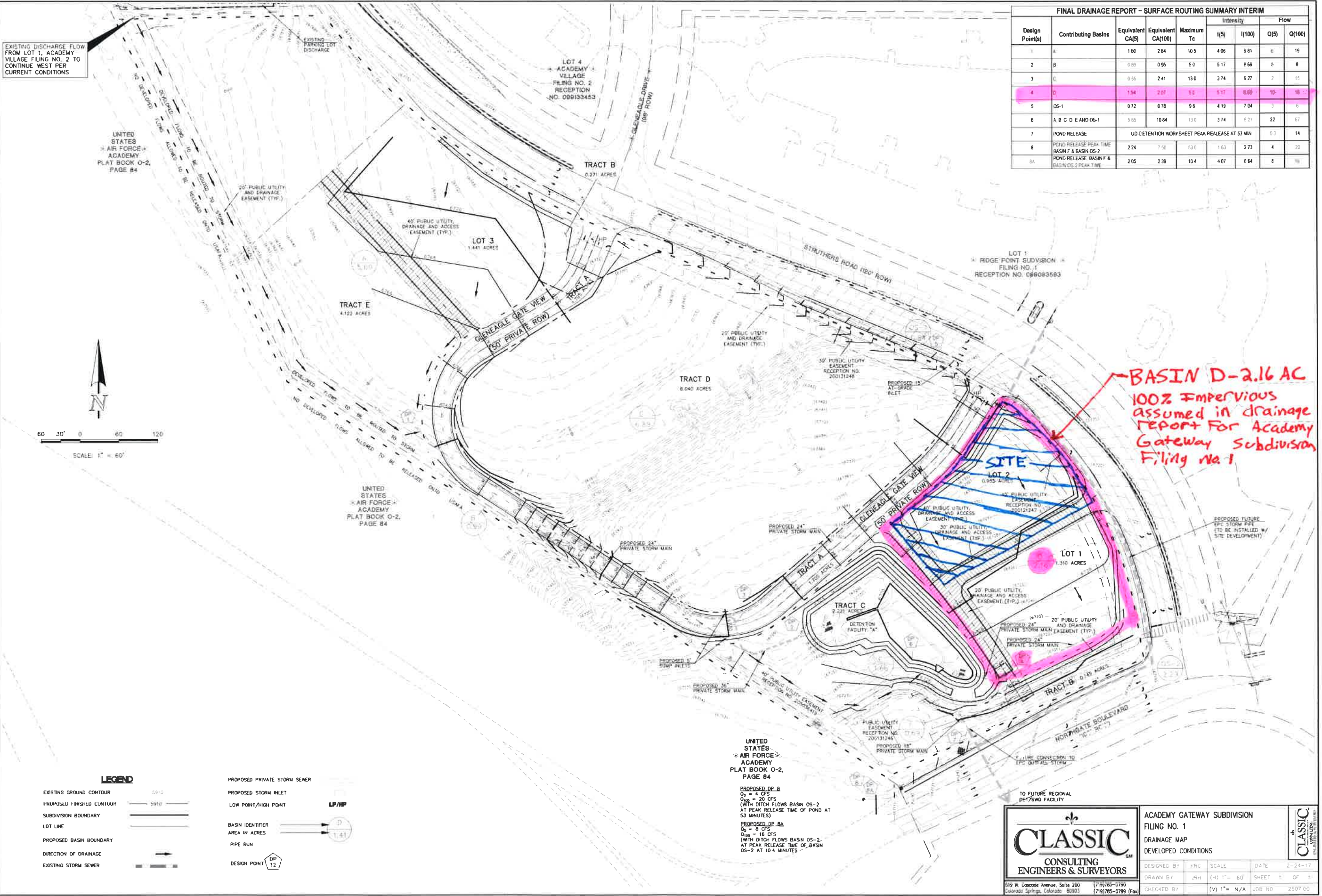
### Selected Drainage Map from Academy Gateway Subdivision Filing No. 1 Drainage Report

Jay M. Newell, PE  
Wayne T. Sterling, RLA, LEED AP

2009 W. Littleton Blvd. #300  
Littleton, CO 80120

303.794.4727  
[www.SterlingDesignAssociates.com](http://www.SterlingDesignAssociates.com)





FINAL DRAINAGE REPORT - SURFACE ROUTING SUMMARY INTERIM							
Design Point(s)	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		
					I(5)	I(100)	Flow
					Q(5)	Q(100)	
1	A	160	284	10.5	4.06	6.81	6
2	B	0.89	0.96	5.0	5.17	6.66	5
3	C	0.55	2.41	13.0	3.74	6.27	2
4	D	1.94	2.87	5.5	5.17	6.66	10
5	OS-1	0.72	0.78	9.6	4.19	7.04	3
6	A B C D E AND OS-1	5.65	10.64	13.0	3.74	6.27	22
7	POND RELEASE	UD DETENTION WORKSHEET PEAK RELEASE AT 53 MIN					0.3
8	POND RELEASE PEAK TIME BASIN F & BASIN OS-2	2.24	7.50	53.0	1.63	2.73	4
8A	POND RELEASE BASIN F & BASIN OS-2 PEAK TIME	2.05	2.39	10.4	4.07	6.64	6

BASIN D-2.16 AC  
100% Impervious  
assumed in drainage  
report for Academy  
Gateway Subdivision  
Filing No. 1

UNITED STATES AIR FORCE ACADEMY PLAT BOOK O-2, PAGE 84  
PROPOSED DP 8  
Q<sub>p</sub> = 4 CFS  
Q<sub>100</sub> = 20 CFS  
(WITH DITCH FLOWS BASIN OS-2 AT PEAK RELEASE TIME OF POND AT 53 MINUTES)  
PROPOSED DP 8A  
Q<sub>p</sub> = 8 CFS  
Q<sub>100</sub> = 18 CFS  
(WITH DITCH FLOWS BASIN OS-2 AT PEAK RELEASE TIME OF BASIN OS-2 AT 10.4 MINUTES)

CLASSIC CONSULTING ENGINEERS & SURVEYORS

ACADEMY GATEWAY SUBDIVISION FILING NO. 1 DRAINAGE MAP DEVELOPED CONDITIONS			
DESIGNED BY	KRC	SCALE	DATE 2-24-17
DRAWN BY	JRH	(H) 1" = 60'	SHEET 1 OF 1
CHECKED BY	(V)	1" = N/A	JOB NO. 2507.60



## Appendix C

### Drainage Letter Addendum for Academy Gateway Subdivision Filing No. 1

Jay M. Newell, PE  
Wayne T. Sterling, RLA, LEED AP

2009 W. Littleton Blvd. #300  
Littleton, CO 80120

303.794.4727  
[www.SterlingDesignAssociates.com](http://www.SterlingDesignAssociates.com)





See file CDR 17-005 for  
signed version of this report.

**DRAINAGE LETTER ADDENDUM FOR  
ACADEMY GATEWAY SUBDIVISION NO. 1**

**DRAINAGE LETTER STATEMENT**

**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 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.

\_\_\_\_\_  
Kyle R Campbell, Colorado P.E. #29794

\_\_\_\_\_  
Date

**DEVELOPER'S STATEMENT:**

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

Business Name: Academy Gateway II, LLC .

By: \_\_\_\_\_

Title: \_\_\_\_\_

Address: 403 S. Tejon Street

Colorado Springs, CO 80903

**EL PASO COUNTY ONLY:**

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.

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

\_\_\_\_\_  
Date

Conditions:





August 11, 2017

City of Colorado Springs  
Engineering Development Review Division  
30 South Nevada, Suite 401  
Colorado Springs, CO 80903

ATTN: Mrs. Jennifer Irvine

RE: Drainage Letter Addendum for Academy Gateway Subdivision Filing No. 1

Dear Jennifer:

Please consider this the Drainage Letter Addendum for Academy Gateway Subdivision Filing No. 1. This letter is being written to further define the storm system required for Lot 1 and Lot 2.

This letter will update storm sewer routing inlet sizes and alignment for Academy Gateway Subdivision Filing No. 1 Lot 1 and Lot 2. More specifically Basin D. Please see the "Preliminary/Final Drainage Report for Academy Gateway Subdivision Filing No. 1" by CCES approved July 6, 2017 report for drainage information. All basins and drainage patterns from the original report remain the same as previously approved with the exception of Design Points 2 & 4 and Basins B & D on attached drainage map excerpt.

Design Point 2 ( $Q_5 = 5$  cfs,  $Q_{100} = 8$  cfs) is the proposed developed flow from Basin B which is predominately the paved surface of Academy Gate View. A proposed private 5' Type R sump inlet will intercept these flows in their entirety. Basin B area has increased from 0.99 acres to 1.08 acres with the addition of a high point in the access roadway adjacent to Lot 1 and Lot 2. No impact to proposed inlet sizing or developed flows.

Design Point 4 and Basin D from the approved report is further broken down based upon future use of Lot 1 and Lot 2. Basin D is broken down into Basins D, D1, D2 D3 and D4 with associated Design Points 4 and 4A for inlet and pipe sizing. Design Point 4 ( $Q_5 = 0.1$  cfs,  $Q_{100} = 3$  cfs) consists of flows from Basin D4 which is private drive aisle. A proposed 5' Type-R inlet will intercept flows. Design Point 4A ( $Q_5 = 0.1$  cfs,  $Q_{100} = 3$  cfs) consists of flows from Basin D2 which is private drive aisle between Lots 1 and 2. A proposed 5' Type-R-at grade inlet will intercept flows. Basin D ( $Q_5 = 4$  cfs,  $Q_{100} = 6$  cfs) consists of future commercial use on Lot 1. Flows will be captured onsite and routed to a provided 18" storm sewer stub (Pipe 5). Basin D3 ( $Q_5 = 2$  cfs,  $Q_{100} = 3$  cfs) consists of future commercial use on Lot 1. Flows will be captured on site and



routed to a provided 12" storm stub. Basin D1 ( $Q_5 = 4$  cfs,  $Q_{100} = 7$  cfs) consists of future commercial use on Lot 2. Flows will be captured onsite and routed to a provided 18" storm sewer stub (Pipe 3). All flows will be routed to the proposed Detention Facility A as previously designed. Per original report Basin Design Point 4 was ( $Q_5 = 10$  cfs,  $Q_{100} = 18$  cfs) and was routed to the detention facility in a proposed 24" Storm system. This is comparable to Pipe 6 ( $Q_5 = 10$  cfs,  $Q_{100} = 18$  cfs) in this addendum. No increase in developed flows is anticipated.

## **SUMMARY**

The original drainage report for Academy Gateway Subdivision Filing No. 1 calculations and report details remain the same. This letter further defines the storm sewer system for Lot 1 and Lot 2 from the previous report.

If you have any questions or comments regarding this drainage, please do not hesitate to call.

Respectfully submitted,

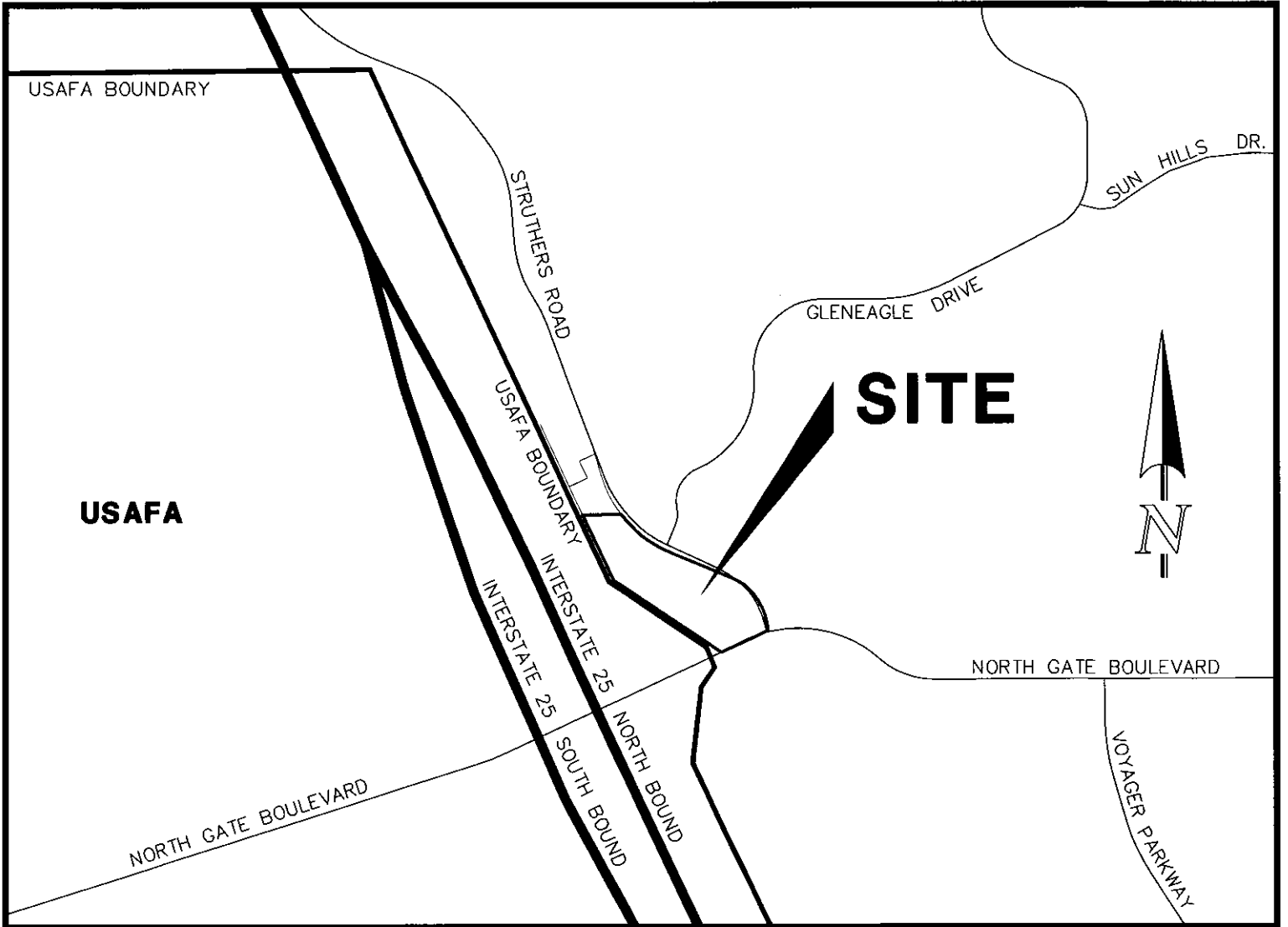
David L. Gibson, P.E.  
Project Engineer





## VICINITY MAP





VICINITY MAP  
NOT TO SCALE





## **REVISED CALCULATIONS**



JOB NAME: Academy Gateway Subd. Fil. No. 1  
 JOB NUMBER: 2507.00  
 DATE: 08/11/17  
 CALCULATED BY: KRC

### FINAL DRAINAGE REPORT ~ BASIN RUNOFF COEFFICIENT SUMMARY - INTERIM

BASIN	TOTAL AREA (AC)	IMPERVIOUS AREA / STREETS			LANDSCAPE/UNDEVELOPED AREAS			WEIGHTED		WEIGHTED CA	
		AREA (AC)	C(2)	C(5)	C(100)	AREA (AC)	C(2)	C(5)	C(100)	CA(5)	CA(100)
B	1.08	0.99	0.89	0.90	0.96	0.09	0.02	0.08	0.35	0.83	0.91
D	0.77	0.77	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.90	0.96
D1	0.87	0.87	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.90	0.96
D2	0.07	0.07	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.90	0.96
D3	0.35	0.35	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.90	0.96
D4	0.10	0.10	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.90	0.96
										0.90	0.96
										0.09	0.10



JOB NAME: Academy Gateway Subd. Fil. No. 1  
 JOB NUMBER: 2507.00  
 DATE: 08/11/17  
 CALCULATED BY: KRC

### FINAL DRAINAGE REPORT ~ BASIN RUNOFF COEFFICIENT SUMMARY - ULTIMATE

BASIN	TOTAL AREA (AC)	IMPERVIOUS AREA / STREETS				LANDSCAPE/UNDEVELOPED AREAS				WEIGHTED			WEIGHTED CA		
		AREA (AC)	C(2)	C(5)	C(100)	AREA (AC)	C(2)	C(5)	C(100)	C(2)	C(5)	C(100)	CA(2)	CA(5)	CA(100)
B	1.08	0.99	0.89	0.90	0.96	0.09	0.02	0.08	0.35	0.82	0.83	0.91	0.88	0.90	0.98
D	0.77	0.77	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.89	0.90	0.96	0.69	0.69	0.74
D1	0.87	0.87	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.89	0.90	0.96	0.77	0.78	0.84
D2	0.07	0.07	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.89	0.90	0.96	0.06	0.06	0.07
D3	0.35	0.35	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.89	0.90	0.96	0.31	0.32	0.34
D4	0.10	0.10	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.89	0.90	0.96	0.09	0.09	0.10



JOB NAME: Academy Gateway Subd. Fil. No. 1

JOB NUMBER: 2507.00

DATE: 08/11/17

CALC'D BY: KRC

## FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY - INTERIM

BASIN	WEIGHTED			OVERLAND			STREET / CHANNEL FLOW				Tc	INTENSITY			TOTAL FLOWS		
	CA(2)	CA(5)	CA(100)	C(5)	Length (ft)	Height (ft)	Tc (min)	Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	I(2) (in/hr)	I(5) (in/hr)	I(100) (in/hr)	Q(2) (cfs)	Q(5) (cfs)	Q(100) (cfs)
B	0.88	0.90	0.98	0.08	0	0	5.0	0	0.0%	0.0	0.0	4.12	5.17	8.68	4	5	9
D	0.69	0.69	0.74	0.08	0	0	5.0	0	0.0%	0.0	0.0	4.12	5.17	8.68	3	4	6
D1	0.77	0.78	0.84	0.08	0	0	5.0	0	0.0%	0.0	0.0	4.12	5.17	8.68	3	4	7
D2	0.06	0.06	0.07	0.08	0	0	5.0	0	0.0%	0.0	0.0	4.12	5.17	8.68	0	0	1
D3	0.31	0.32	0.34	0.08	0	0	5.0	0	0.0%	0.0	0.0	4.12	5.17	8.68	1	2	3
D4	0.09	0.09	0.10	0.08	0	0	5.0	0	0.0%	0.0	0.0	4.12	5.17	8.68	0	0	1



JOB NAME: Academy Gateway Subd. Fil. No. 1

JOB NUMBER: 2507.00

DATE: 08/11/17

CALC'D BY: KRC

## FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY - ULTIMATE

BASIN	WEIGHTED			OVERLAND			STREET / CHANNEL FLOW				Tc	INTENSITY			TOTAL FLOWS		
	CA(2)	CA(5)	CA(100)	C(5)	Length (ft)	Height (ft)	Tc (min)	Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	I(2) (in/hr)	I(5) (in/hr)	I(100) (in/hr)	Q(2) (cfs)	Q(5) (cfs)	Q(100) (cfs)
B	0.88	0.89	0.95	0.08	0	0	5.0	0	0.0%	0.0	0.0	4.12	5.17	8.68	4	5	8
D	0.69	0.69	0.74	0.08	0	0	5.0	0	0.0%	0.0	0.0	4.12	5.17	8.68	3	4	6
D1	0.77	0.78	0.84	0.08	0	0	5.0	0	0.0%	0.0	0.0	4.12	5.17	8.68	3	4	7
D2	0.06	0.06	0.07	0.08	0	0	5.0	0	0.0%	0.0	0.0	4.12	5.17	8.68	0	0	1
D3	0.31	0.32	0.34	0.08	0	0	5.0	0	0.0%	0.0	0.0	4.12	5.17	8.68	1	2	3
D4	0.09	0.09	0.10	0.08	0	0	5.0	0	0.0%	0.0	0.0	4.12	5.17	8.68	0	0	1



JOB NAME: Academy Gateway Subd. Fil. No. 1  
 JOB NUMBER: 2507.00  
 DATE: 08/11/17  
 CALCULATED BY: KRC

FINAL DRAINAGE REPORT ~ SURFACE ROUTING SUMMARY INTERIM								
Design Point(s)	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow	
					I(5)	I'(100)	Q(5)	Q(100)
2	B	0.89	0.95	5.0	5.17	8.68	5	8
4	D4	0.09	0.10	5.0	5.17	8.68	0.5	1
4A	D2	0.06	0.07	5.0	5.17	8.68	0.3	1



JOB NAME: Academy Gateway Subd. Fil. No. 1  
 JOB NUMBER: 2507.00  
 DATE: 08/11/17  
 CALCULATED BY: KRC

FINAL DRAINAGE REPORT ~ SURFACE ROUTING SUMMARY - ULTIMATE								
Design Point(s)	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow	
					I(5)	I(100)	Q(5)	Q(100)
2	B	0.89	0.95	5.0	5.17	8.68	5	8
4	D4	0.09	0.10	5.0	5.17	8.68	0.5	1
4A	D2	0.06	0.07	5.0	5.17	8.68	0.3	1



JOB NAME: Academy Gateway Subd. Fil. No. 1  
 JOB NUMBER: 2507.00  
 DATE: 08/11/17  
 CALCULATED BY: KRC

\* PIPES ARE LISTED AT MAXIMUM SIZE REQUIRED TO ACCOMMODATE Q100 FLOWS AT MINIMUM GRADE.  
 REFER TO INDIVIDUAL PIPE SHEETS FOR HYDRAULIC INFORMATION.

### FINAL DRAINAGE REPORT ~ PIPE ROUTING SUMMARY

Pipe Run	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		Pipe Size*
					I(5)	I(100)	Q(5)	Q(100)	
1	BASIN D3	0.32	0.34	5.00	5.17	8.68	2	3	12" STORM
2	PIPE 1 DP 4A	0.38	0.40	5.00	5.17	8.68	2	3	18" STORM
3	BASIN D1	0.78	0.84	5.00	5.17	8.68	4	7	18" STORM
4	PIPE 2 & PIPE 3	1.16	1.24	5.00	5.17	8.68	6	11	24" STORM
5	BASIN D	0.69	0.74	5.00	5.17	8.68	4	6	18" STORM
6	PIPE 4, PIPE 5 & DP 4	1.94	2.07	5.00	5.17	8.68	10	18	24" STORM



JOB NAME: Academy Gateway Subd. Fil. No. 1  
JOB NUMBER: 2507.00  
DATE: 08/11/17  
CALCULATED BY: KRC

**DESIGN POINT** **4**

Total Flow:  $Q_5 = 0$  cfs  
 $Q_{100} = 1$  cfs

Maximum allowable ponding depth at sump:

$D_5 = 0.50$   
 $D_{100} = 1.00$  (dmax)

$Q_i = 1.7(L_i + 1.8(W))(d_{max} + w/12)^{1.85}$

Clogging Factor = 1.25  
 $L_i (1.25) =$  Length of inlet opening

5-Year Event:  foot inlet required

100-Year Event:  foot inlet required

INSTALL A PUBLIC  FT D-10-R INLET TO ACCEPT BOTH 5YR & 100 YR DEVELOPED FLOWS AT THIS DESIGN POINT.



JOB NAME:	Academy Gateway Subd. Fil. No. 1				
JOB NUMBER:	2507.00				
DATE:	08/11/17				
CALCULATED BY:	KRC				
<b>DESIGN POINT                      4A                                      100 YEAR FLOW</b>					
Q(100)	1	I(100)	8.7		
DEPTH	0.20	Fr	1.83	Inlet size ? L(i) =	5
SPREAD	3.5	L(1)	4.9	If Li < L(2) then Qi =	1
CROSS SLOPE	2.0%	L(2)	3.0	If Li > L(2) then Qi =	0.4
STREET SLOPE	4.0%	L(3)	10.5	FB =	0
				CA(eqv.)=	0.00
<b>5 YEAR FLOW</b>					
Q(5)	0.3	I(5)	5.2		
DEPTH	0.20	Fr	1.87	Inlet size ? L(i) =	5
SPREAD	3.8	L(1)	5.4	If Li < L(2) then Qi =	0
CROSS SLOPE	2.0%	L(2)	3.2	If Li > L(2) then Qi =	0
STREET SLOPE	4.0%	L(3)	11.6	FB =	0
				CA(eqv.)=	0.00





## **DRAINAGE MAP**



**LEGEND**

- EXISTING GROUND CONTOUR 5910
- PROPOSED FINISHED CONTOUR 5910
- SUBDIVISION BOUNDARY
- LOT LINE
- PROPOSED BASIN BOUNDARY
- DIRECTION OF DRAINAGE
- EXISTING STORM SEWER
- PROPOSED PRIVATE STORM SEWER
- PROPOSED STORM INLET
- BASIN IDENTIFIER
- AREA IN ACRES
- PIPE RUN
- DESIGN POINT



PROPOSED FUTURE  
EPC STORM PIPE  
(TO BE INSTALLED W/  
SITE DEVELOPMENT)

ACADEMY GATEWAY SUB. FIL 1  
ADDENDUM  
JOB NO. 2507.00  
AUGUST 9, 2017  
SHEET 1 OF 1



619 N. Cascade Avenue, Suite 200  
Colorado Springs, Colorado 80903  
(719) 785-0790  
(719) 785-0799 (Fax)



# Appendix D

## Drainage Plan

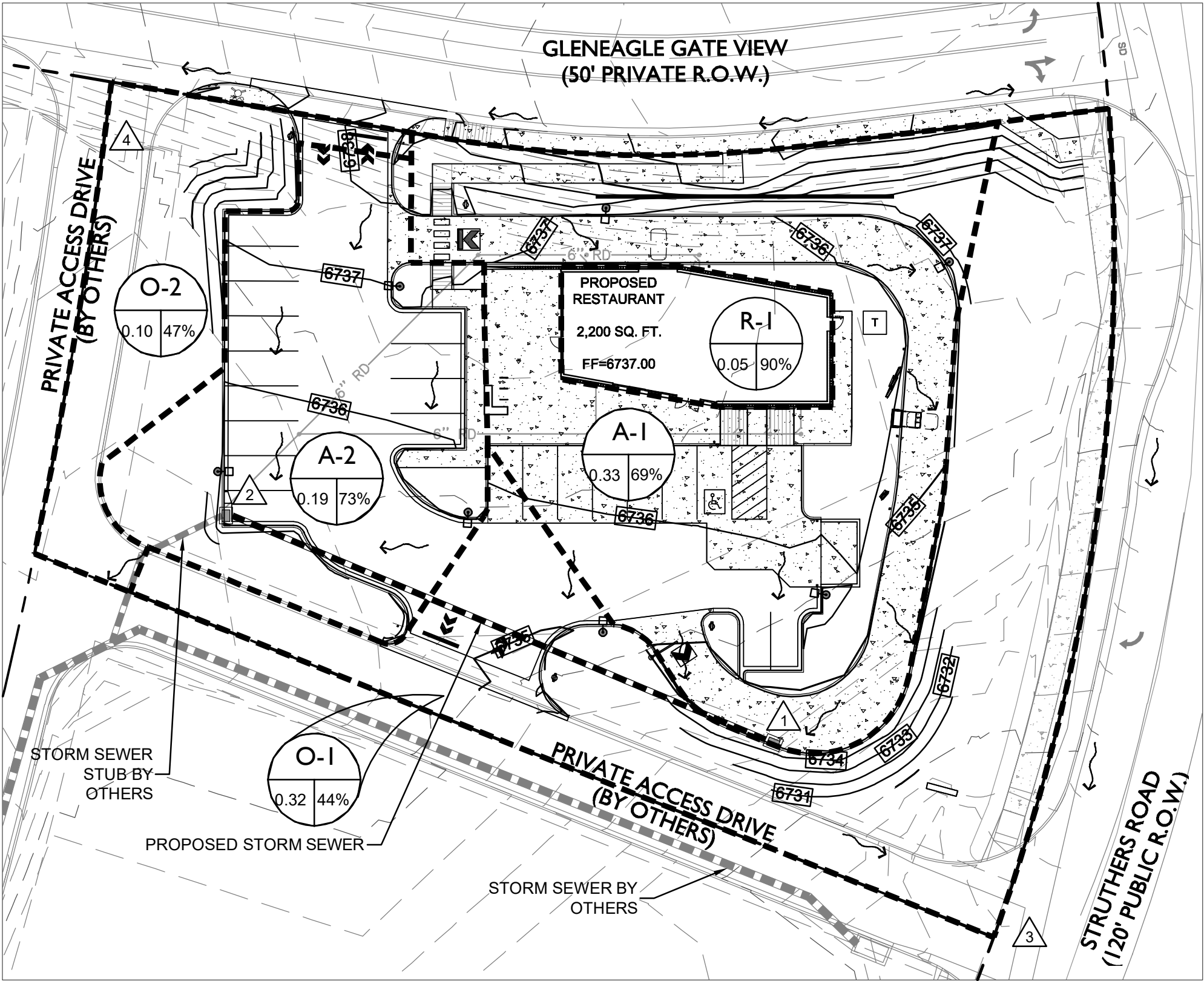
Jay M. Newell, PE  
Wayne T. Sterling, RLA, LEED AP

2009 W. Littleton Blvd. #300  
Littleton, CO 80120

303.794.4727  
[www.SterlingDesignAssociates.com](http://www.SterlingDesignAssociates.com)

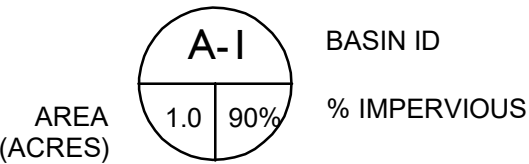


DRAINAGE PLAN (PROPOSED CONDITION)



LEGEND

- R.O.W. / PROPERTY LINE
- EXISTING TO REMAIN
- == PROP. CURB AND GUTTER
- 7512 — EXIST. CONTOUR
- 7512 — PROP. CONTOUR
- BASIN LINE
- FLOW ARROW
- △ 1 DESIGN POINT



IMPERVIOUS DATA

AREA OF ANALYSIS: 0.99 ACRES  
 PROPOSED PERCENT IMPERVIOUS: 60.0%

GENERAL NOTE

THIS PLAN IS INTENDED TO BE USED AS A REFERENCE IN CONJUNCTION WITH THE DRAINAGE COMPLIANCE LETTER. DO NOT USE THIS PLAN FOR BID OR CONSTRUCTION.

