GCW
ENGINEERS \ SURVEYORS

Supplement to the Response to Comments on the Technical Drainage Study for

CSN Center For Excellence In Public Safety

810-001

May 2025

Prepared for:
College of Southern Nevada
Facilities Management
311 Water Street, Suite 119
Henderson, NV 89015

Prepared by GCW, Inc.

1555 South Rainbow Blvd
Las Vegas, NV 89146

P: 702.804.2000
F: 702.804.2298

info@gcwengineering.com
www.gcwengineering.com

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: CSN Center For Excellence In Public Safety Date: May 2025

Location of Development: a) Descriptive (Cross Streets) North/South: Durango Drive

East/West: Elkhorn Road

b) Section: 17 Township: 19S Range: 60E

c) APN : 125-17-801-009

Name of Owner: Owner: Nevada System of Higher Education/ Client: College of Southern Nevada Facilities Management

Telephone No.: Fax No.: E-Mail Address:

Address: 311 Water Street, Suite 119 Henderson, NV 89015

Contact Person-Name: Nelson Baggs, PE **Telephone No.:** (702) 804-2000

* **E-Mail Address:** NBaggs@gcwengineering.com **Fax No.:** (702) 804-2299

Firm: GCW, Inc.

Address: 1555 South Rainbow Boulevard, Las Vegas, Nevada 89146

Type of Land Development/Land Disturbance Process:

	Rezoning		Subdivision Map		Clearing and Grading Only
	Parcel Map		Planned Unit Development		Other (Please specify below)
	Large Parcel Map	X	Building Permit		

1. Total Owned Land Area: At Site: +/-40.92 Being Developed/Disturbed: +/-17.04
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ **Yes**** ☒ **No**
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☐ **Yes**** ☒ **No**
4. Proposed type of development (Residential, Commercial, Etc.): Commercial
5. Approximate upstream land area which drains to the subject site: +/- 1.08 ac
6. Has the site drainage been evaluated in the past? ☐ **YES** ☒ **NO** If yes, please identify documentation:
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Grand Montecito and existing storm drain system in Elkhorn Road
8. Briefly describe your proposed schedule for the subject project: ASAP

Engineer's Seal

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

*New Required Field

**Review and concurrence of the Clark County Regional Flood Control District is required.

Revision	Date

Local Entity File No.

REFERENCE:

STANDARD FORM 1

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: April 22, 2025
TO: **Land Development Services** Department of Community Development – Building & Safety Division				FROM: Tyler Key Flood Control Engr. Associate Department of Public Works
SUBJECT:	Drainage Study for:			**COPIES TO:**
CSN Center For Excellence in Public Safety				GCW, Inc.
Cross Streets:	Durango Dr. & Elkhorn Rd.			Nevada System of Higher Education
File Number:	F:\Depot\DSMemos\DS5826B.doc			Lucien Paet P.E., DevCo
Parcel Number:	125-17-801-009			
Zoning Action:	24-0545-[VAR1, SDR1]			
FEMA Flood Zone	YES	NO **X**		
Proposed Storm Drain	YES **X**	NO		

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	12/9/2024	12/26/2024	Not Approved	$400	6042923: $400
2nd Submittal	4/7/2025	4/22/2025	See Comments Below	$400	6189836: $400
			TOTAL FEES (LDDRS):	**$800**	**----**

REMARKS:

The Drainage Study for the subject project has been reviewed and:

	is approved subject to conformance to all City standards and the following conditions:
X	must be resubmitted or supplemented including the following:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is conditionally approved subject to Clark County Public Works Department concurrence.

1. The FlowMaster cross sections can be extended from the median to the proposed wall along Elkhorn & Durango, but the section cannot be split into two sections with different flows. Flood protection is required along Durango & Elkhorn

2. A Drainage Study Update will be required for all future structures to be constructed to ensure appropriate drainage and finish floors.

***** The City of Las Vegas Flood Control is standardizing the file naming of drainage studies and plans during the digitizing process. When saving the project files in the CD or thumb drive, please follow the system below:**

If drainage study only contains one combined file, use the following naming convention in Document Title:

1st Submittal DS and Plans (for first and original submittal);

2nd Submittal DS and Plans (for second submittal (addendum #1)) etc.

If drainage study contains multiple files, use the following naming convention in Document Title:

1st Submittal DS (for the report of the drainage study)

1st Submittal Plan 1 (could be the drainage condition maps)

1st Submittal Plan 2 (could be the improvement plans) etc.

NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the *Nevada Division of Environmental Protection* a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see http://ndep.nv.gov/bwpc/storm01.htm or call (775) 687-9429.

NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved drainage study and attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Update and accepted by the *City of Las Vegas Flood Control Section*. Additionally, final approval of a drainage study is valid for a period of one (1) year. If the proposed construction has not been completed in that time period, the *City of Las Vegas* reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction of a project.

END OF REMARKS
TJK

T/R/S: T19S/R60E/S17
AREA G17

810-001

May 5, 2025

Subject: **Supplement to the Response to Comments on the Technical Drainage Study for CSN Center for Excellence in Public Safety (DS5826)**

This letter addresses the City of Las Vegas (CLV) review comments dated April 22, 2025. As discussed with CLV, it was agreed that these comments can be addressed as a supplement. The comments and responses are provided below.

Comment 1:

The FlowMaster cross sections can be extended from the median to the proposed wall along Elkhorn & Durango, but the section cannot be split into two sections with different flows. Flood protection is required along Durango & Elkhorn.

Response:

Acknowledged. Riprap has been provided a minimum of 6-inches above top of curb in the landscape portions along Durango and Elkhorn to provide protection from erosive velocities. Hydraulic sections to size the riprap have been provided in the Appendix. Note that since these sections include areas outside of the right-of-way they do not replace previous Sections 5A and 6A; however, the roadway still meets 100-year criteria, and the proposed finished floor is still flood protected using the results.

Comment 2:

A Drainage Study Update will be required for all future structures to be constructed to ensure appropriate drainage and finish floors.

Response:

Noted.

If you have any questions or require additional information, please do not hesitate to contact GCW at (702) 804-2000.

Respectfully,

GCW, Inc.

Nelson Baggs, PE
Flood Control Division

Elizabeth Martinez, EI

APPENDIX

EMAIL COORDINATION WITH CLV

Elizabeth Martinez

From: Nelson Baggs
Sent: Tuesday, April 29, 2025 7:39 AM
To: Elizabeth Martinez
Subject: FW: CSN Center for Excellence - DS5826B

Nelson Baggs, PE
GCW, Inc. | Direct: 702 804 2128
Sending us a large file? **Use the** GCW File Transfer Site

From: Tyler Key <tkey@LasVegasNevada.GOV>
Sent: Monday, April 28, 2025 2:00 PM
To: Nelson Baggs <NBaggs@gcwengineering.com>
Cc: Albert Sung <YSung@LasVegasNevada.GOV>
Subject: RE: CSN Center for Excellence - DS5826B

Hi Nelson,

Yes, this submittal can be a supplement to resolve the last remaining comment.

Thank you,

Tyler Key
Engineering Associate
Public Works | City Engineering
Phone 702-229-6733
495 S. Main St. | Las Vegas, NV 89101

lasvegasnevada.gov

From: Nelson Baggs <NBaggs@gcwengineering.com>
Sent: Monday, April 28, 2025 1:23 PM
To: Tyler Key <tkey@LasVegasNevada.GOV>
Cc: Albert Sung <YSung@LasVegasNevada.GOV>
Subject: RE: CSN Center for Excellence - DS5826B

Hi Tyler,

Since this is only 1 comment can we submit this as a supplement?

Thank you

Nelson Baggs, PE
GCW, Inc. | Direct: 702 804 2128
Sending us a large file? **Use the** GCW File Transfer Site

From: Tyler Key <tkey@LasVegasNevada.GOV>
Sent: Tuesday, April 22, 2025 11:41 AM
To: Nelson Baggs <NBaggs@gcwengineering.com>
Cc: Albert Sung <YSung@LasVegasNevada.GOV>
Subject: DS5826B

Good morning Nelson,

Here is the memo for the CSM Center for Excellence drainage study. Let me know if you have any questions.

Thank you,

Tyler Key
Engineering Associate
Public Works | City Engineering
Phone 702-229-6733
495 S. Main St. | Las Vegas, NV 89101

lasvegasnevada.gov

Worksheet for Elkhorn Rd (MAX SLOPE) (PRO 100YR) LS Riprap Sizing

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.12 %
Discharge	97.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
-0+12.50	1.75
-0+12.50	0.75
-0+07.50	0.65
-0+02.50	0.55
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+36.00	0.85
0+36.00	1.35

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+12.50, 1.75)	(-0+12.50, 0.75)	0.013
(-0+12.50, 0.75)	(-0+07.50, 0.65)	0.037
(-0+07.50, 0.65)	(-0+02.50, 0.55)	0.013
(-0+02.50, 0.55)	(0+00.00, 0.50)	0.037
(0+00.00, 0.50)	(0+36.00, 1.35)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.85 ft
Roughness Coefficient	0.020
Elevation	0.85 ft
Elevation Range	0.00 to 1.75 ft
Flow Area	16.0 ft²
Wetted Perimeter	49.15 ft

Worksheet for Elkhorn Rd (MAX SLOPE) (PRO 100YR) LS Riprap Sizing

Results	
Hydraulic Radius	0.32 ft
Top Width	48.50 ft
Normal Depth	0.85 ft
Critical Depth	1.02 ft
Critical Slope	0.79 %
Velocity	6.08 ft/s
Velocity Head	0.57 ft
Specific Energy	1.43 ft
Froude Number	1.867
Flow Type	Supercritical

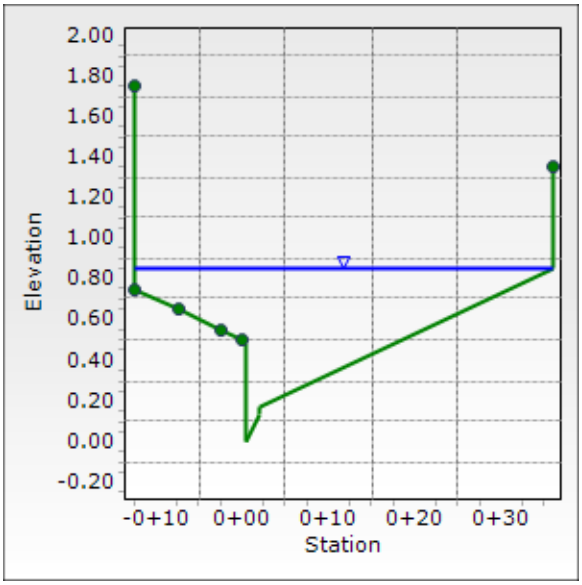
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.85 ft
Critical Depth	1.02 ft
Channel Slope	3.12 %
Critical Slope	0.79 %

Cross Section for Elkhorn Rd (MAX SLOPE) (PRO 100YR) LS Riprap Sizing

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.12 %
Normal Depth	0.85 ft
Discharge	97.00 cfs



Worksheet for Elkhorn Rd (MIN SLOPE) (PRO 100YR) LS Riprap Sizing

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	2.50 %
Discharge	97.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
-0+12.50	1.75
-0+12.50	0.75
-0+07.50	0.65
-0+02.50	0.55
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+36.00	0.85
0+36.00	1.35

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+12.50, 1.75)	(-0+12.50, 0.75)	0.013
(-0+12.50, 0.75)	(-0+07.50, 0.65)	0.037
(-0+07.50, 0.65)	(-0+02.50, 0.55)	0.013
(-0+02.50, 0.55)	(0+00.00, 0.50)	0.037
(0+00.00, 0.50)	(0+36.00, 1.35)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.88 ft
Roughness Coefficient	0.020
Elevation	0.88 ft
Elevation Range	0.00 to 1.75 ft
Flow Area	17.1 ft²
Wetted Perimeter	49.19 ft

Worksheet for Elkhorn Rd (MIN SLOPE) (PRO 100YR) LS Riprap Sizing

Results	
Hydraulic Radius	0.35 ft
Top Width	48.50 ft
Normal Depth	0.88 ft
Critical Depth	1.02 ft
Critical Slope	0.79 %
Velocity	5.69 ft/s
Velocity Head	0.50 ft
Specific Energy	1.38 ft
Froude Number	1.690
Flow Type	Supercritical

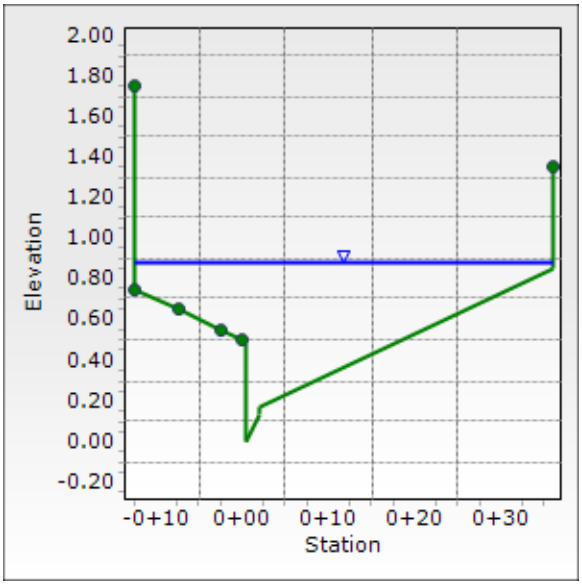
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.88 ft
Critical Depth	1.02 ft
Channel Slope	2.50 %
Critical Slope	0.79 %

Cross Section for Elkhorn Rd (MIN SLOPE) (PRO 100YR) LS Riprap Sizing

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	2.50 %
Normal Depth	0.88 ft
Discharge	97.00 cfs



Channel Protection Sizing Using Equation 734

Known:

d50=	Riprap size (in)	8
Sg=	Specific Gravity of Rock (typ=2.5)	2.5
s=	Longitudinal Channel Slope (ft/ft)	0.0312

$Vel=3*(d_{50}^{0.5})*(Sg-1)/(S^{0.17})$

Solve For:

Max Allowable Velocity= 6.62 fps

MAX SLOPE USED TO SIZE RIPRAP. DEPTH FROM MIN SLOPE CALCULATION USED TO CHECK HOW HIGH RIPRAP NEEDS TO EXTEND

Worksheet for Durango Dr (MAX SLOPE) (PRO 100YR) LS Riprap Sizing

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Channel Slope	2.59	%
Discharge	73.00	cfs

Section Definitions

Station (ft)	Elevation (ft)
-0+19.50	1.89
-0+19.50	0.89
-0+14.50	0.79
-0+05.00	0.60
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+38.00	0.89
0+38.00	1.39

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+19.50, 1.89)	(-0+19.50, 0.89)	0.013
(-0+19.50, 0.89)	(-0+14.50, 0.79)	0.035
(-0+14.50, 0.79)	(-0+05.00, 0.60)	0.013
(-0+05.00, 0.60)	(0+00.00, 0.50)	0.035
(0+00.00, 0.50)	(0+38.00, 1.39)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results		
Normal Depth	0.80	ft
Roughness Coefficient	0.019	
Elevation	0.80	ft
Elevation Range	0.00 to 1.89	ft
Flow Area	13.5	ft^2
Wetted Perimeter	49.17	ft

Worksheet for Durango Dr (MAX SLOPE) (PRO 100YR) LS Riprap Sizing

Results	
Hydraulic Radius	0.27 ft
Top Width	48.63 ft
Normal Depth	0.80 ft
Critical Depth	0.94 ft
Critical Slope	0.72 %
Velocity	5.41 ft/s
Velocity Head	0.45 ft
Specific Energy	1.26 ft
Froude Number	1.811
Flow Type	Supercritical

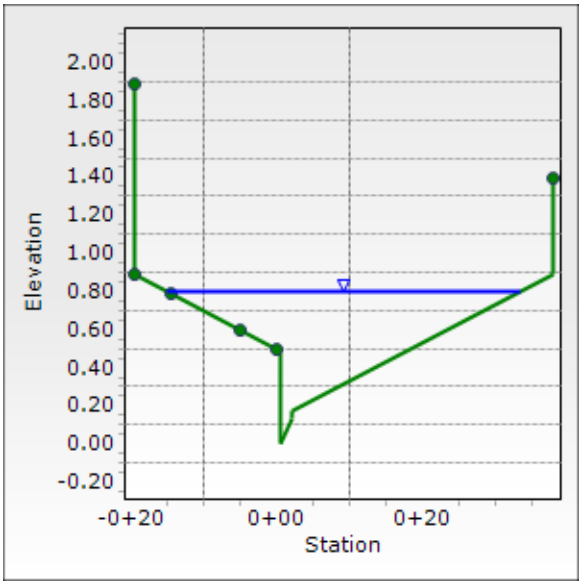
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.80 ft
Critical Depth	0.94 ft
Channel Slope	2.59 %
Critical Slope	0.72 %

Cross Section for Durango Dr (MAX SLOPE) (PRO 100YR) LS Riprap Sizing

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	2.59 %
Normal Depth	0.80 ft
Discharge	73.00 cfs



Worksheet for Durango Dr (MIN SLOPE) (PRO 100YR) LS Riprap Sizing

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Channel Slope	1.06	%
Discharge	73.00	cfs

Section Definitions

Station (ft)	Elevation (ft)
-0+19.50	1.89
-0+19.50	0.89
-0+14.50	0.79
-0+05.00	0.60
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+38.00	0.89
0+38.00	1.39

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+19.50, 1.89)	(-0+19.50, 0.89)	0.013
(-0+19.50, 0.89)	(-0+14.50, 0.79)	0.035
(-0+14.50, 0.79)	(-0+05.00, 0.60)	0.013
(-0+05.00, 0.60)	(0+00.00, 0.50)	0.035
(0+00.00, 0.50)	(0+38.00, 1.39)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results		
Normal Depth	0.92	ft
Roughness Coefficient	0.020	
Elevation	0.92	ft
Elevation Range	0.00 to 1.89	ft
Flow Area	19.8	ft^2
Wetted Perimeter	58.09	ft

Worksheet for Durango Dr (MIN SLOPE) (PRO 100YR) LS Riprap Sizing

Results	
Hydraulic Radius	0.34 ft
Top Width	57.50 ft
Normal Depth	0.92 ft
Critical Depth	0.94 ft
Critical Slope	0.84 %
Velocity	3.69 ft/s
Velocity Head	0.21 ft
Specific Energy	1.13 ft
Froude Number	1.109
Flow Type	Supercritical

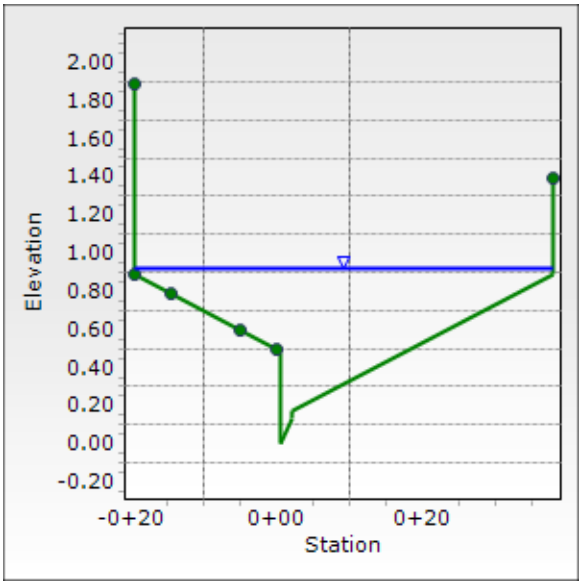
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.92 ft
Critical Depth	0.94 ft
Channel Slope	1.06 %
Critical Slope	0.84 %

Cross Section for Durango Dr (MIN SLOPE) (PRO 100YR) LS Riprap Sizing

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	1.06 %
Normal Depth	0.92 ft
Discharge	73.00 cfs



Channel Protection Sizing Using Equation 734

Known:

d50=	Riprap size (in)	6
Sg=	Specific Gravity of Rock (typ=2.5)	2.5
s=	Longitudinal Channel Slope (ft/ft)	0.0259

$Vel=3*(d_{50}^{0.5})*(Sg-1)/(S^{0.17})$

Solve For:

Max Allowable Velocity= 5.92 fps

MAX SLOPE USED TO SIZE RIPRAP. DEPTH FROM MIN SLOPE CALCULATION USED TO CHECK HOW HIGH RIPRAP NEEDS TO EXTEND