TAIT
RISING TO THE CHALLENGE
6163 E. County Road 16, Loveland, CO 80537
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February 26, 2020

El Paso County Planning & Community Development
2880 International Circle, Suite 110
Colorado Springs, CO 80910

O'Reilly Auto Parts located at 2417 Marksheffel Road in Colorado Springs, CO
Drainage Analysis Letter

To Whom It May Concern:

This letter is in regards to the proposed drainage analysis requested for the redevelopment of the property at 2417 Marksheffel Road in Colorado Springs, CO for an O'Reilly Auto Parts store. The proposed development is located in the northeast part of Colorado Springs, near the corner of Marksheffel Road and Constitution Ave. The site consists of 0.97 acres of undeveloped land. New drainage patterns will direct the runoff generated from the proposed development into three storm drain inlets along the south portion of the property. The proposed 12" and 15" storm drains will convey the runoff from west to east and discharge into the existing storm drain manhole along the east property line. The runoff will follow existing patterns and discharge into the water quality and detention pond to the east of the site. The existing site consists of undeveloped land with weed growth. The existing site's soil is categorized as Hydraulic Soil Group B. The proposed development will adhere to the original drainage plan for the overall development.

<u>Four Step Process</u>

Step 1: Runoff Reduction Practices

Steps have been taken to minimize impervious surfaces and maximize landscaping onsite. The use of grass buffers or swales is not practical on a site of this size.

Step 2: Treat and slowly release the Water Quality Capture Volume (WQCV)

An existing pond is located east of the site across the access road that was designed to accommodate the water quality capture volume from this site. The proposed site is in conformance with the overall design. Therefore, no onsite water quality is required.

Step 2: Stabilize Stream Channels

There are no stream channels onsite and therefore this step is not applicable.

Step 4: Implement Source Controls

Source controls will be implemented for the proposed site. The SWMP discusses the source control measures that will be taken and are applicable to the site. They are spill prevention containment and control, good housekeeping, preventative maintenance, use of pesticides, herbicides, and fertilizers, landscape maintenance, snow and ice management, street sweeping and cleaning, and storm sewer system cleaning.

The proposed development is divided into four onsite drainage basins. Basins A1, A2, and A3 will be captured and conveyed to the detention pond east of the site. Basin B1 will sheet flow offsite and follow existing patterns as shown in the overall development drainage report. The runoff from Basin A1 will be captured by a curb inlet at the southwest corner of the basin and conveyed to the east. Basin A1 has a runoff coefficient of 0.95 and a runoff of 2.52 cfs. The runoff in Basin A2 will be captured by an area inlet within the landscaped area south of the building. The roof drains will also discharge to the south and be directed towards the inlet. Basin A2 has a runoff coefficient of 0.72 and a runoff of 1.33 cfs. The runoff in Basin A3 will be directed to the south portion of the basin where it will be collected

by a curb inlet and conveyed to the east. Basin A3 has a runoff coefficient of 0.83 and a runoff of 1.85 cfs. Runoff from Basins A1, A2, and A3 will be conveyed to the east and discharged into the existing storm drain manhole within the Access Road east of the site. The runoff will then be discharged into the existing pond east of the site where it will be treated and detained. The runoff in Basin B1 will follow existing patterns and the patterns of the overall development drainage plan. The runoff will sheet flow to the right-of-way and be conveyed to the existing inlet on Marksheffel Road. Basin B1 has a runoff coefficient of 0.39 and a runoff of 0.66 cfs.

The finished site will have a runoff coefficient of 0.75 and an imperviousness of 64%. This is lower than the overall development's anticipated imperviousness of the site of 95%. The assumed imperviousness is shown for Basin D7 in the Final Drainage Report for SEC of Marksheffel Rd. & Constitution Ave. prepared by Galloway & Company, Inc. dated September 14, 2015 (PCD File No. SF1511). Basins A1, A2, and A3 are captured onsite and combine for a runoff of 3.15 and 5.70 cfs for the 5-yr and 100-yr storms respectively. Basin B1 is allowed to flow offsite and has 0.13 and 0.66 cfs for the 5-yr and 100-yr storms respectively. The runoff is consistent with what was expected in the overall development drainage report.

The redevelopment of this site has been designed in accordance with good engineering practices and will have no foreseeable negative impacts on the existing improvements. This drainage letter is in conformance with the overall drainage report prepared by Galloway. The drainage plan and hydraulic calculations have been attached with this letter for reference. Please contact us if you have any questions or comments.

Drainage Fee Note: Drainage fees are paid with the final plat with no additional fees due with the site plan applications. The drainage fees for this project have been paid under the submission of the original plat for the development of which this project is located within.

Sincerely,
TAIT & Associates, Inc.

COLORADO LICENSED
ALEX HOIME
41703
2-26-2020
PROFESSIONAL ENGINEER

Alex Hoime, PE
Vice President

Enclosed: Hydraulic Calculations, Pre and Post-Development Drainage Plans

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.

Alex Hoime, P.E. 41703

2-26-2020
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.

Scott Kraus, SVP Real Estate & Expansion
O'Reilly Auto Enterprises, LLC
233 South Patterson
Springfield, MO 65802

6-8-20
Date

El Paso County:

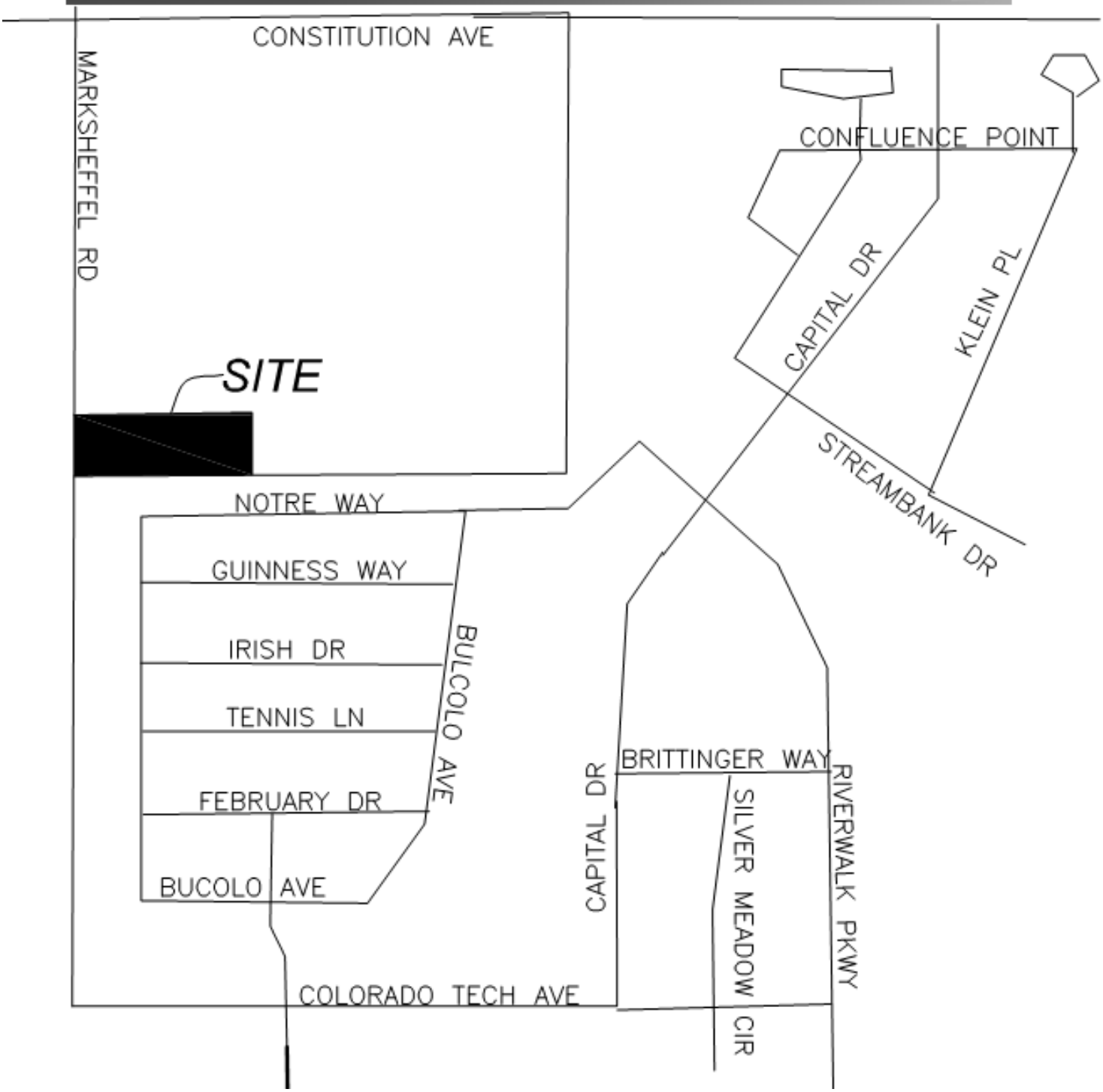
Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

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

Approved
By: Elizabeth Nijkamp
Date:06/24/2020
El Paso County Planning & Community Development

Conditions:

Vicinity Map



RUNOFF COEFFICIENT CALCULATIONS

Project Name: OA1140A
Calculated By: NB
Check By: AH
Date: 10/9/2019

RECOMMENDED RUNOFF COEFFICIENT AND PERCENT IMPERVIOUS[1]			
		RUNOFF COEFFICIENT	
LAND USE	% IMPERVIOUS	5 YEAR	100 YEAR
LANDSCAPE	2.00	0.08	0.35
DRIVES AND WALKS	90.00	0.90	0.96
ROOFS	90.00	0.73	0.81

PRE-DEVELOPMENT CONDITIONS:

AREA DESIGN	A(LAND.) AC	A(PAVED) AC	A(ROOFS) AC	A(TOTAL) AC	COMPOSITE C5	COMPOSITE C100	% IMPERVIOUS
PRE	0.97	0.00	0.00	0.97	0.08	0.35	2.00

POST-DEVELOPMENT CONDITIONS:

AREA DESIGN	A(LAND.) AC	A(PAVED) AC	A(ROOFS) AC	A(TOTAL) AC	COMPOSITE C5	COMPOSITE C100	% IMPERVIOUS
A1	0.003	0.30	0.00	0.30	0.89	0.95	89.19
A2	0.043	0.00	0.17	0.21	0.60	0.72	72.32
A3	0.06	0.20	0.00	0.26	0.72	0.83	71.17
B1	0.18	0.01	0.00	0.20	0.13	0.39	7.39
			TOTAL:	0.97	0.63	0.75	64.18

1 Runoff coefficients and percent impervious per City of Colorado Springs Drainage Criteria Manual Volume 1

5-YEAR INDIVIDUAL BASIN FLOWS

Project Name: OA1140A
Calculated By: NB
Check By: AH
Date: 10/9/2019

PRE-DEVELOPMENT CONDITIONS:

SUB-BASIN DATA					DIRECT RUNOFF	
CONTRIBUTING BASINS	BASIN AREA (acre)	C5	EFFECTIVE AREA (acre)	SUB BASIN Tc (min)	I (in/hr)	SUB BASIN Q (cfs)
PRE	0.97	0.08	0.08	5.00	5.17	0.40
					TOTAL:	0.40

POST-DEVELOPMENT CONDITIONS:

SUB-BASIN DATA					DIRECT RUNOFF	
CONTRIBUTING BASINS	BASIN AREA (acre)	C5	EFFECTIVE AREA (acre)	SUB BASIN Tc (min)	I (in/hr)	SUB BASIN Q (cfs)
A1	0.30	0.89	0.27	5.00	5.17	1.40
A2	0.21	0.60	0.13	5.00	5.17	0.66
A3	0.26	0.72	0.19	5.00	5.17	0.96
B1	0.20	0.13	0.03	5.00	5.17	0.13
					TOTAL:	3.16

Q5= C*I*A

100-YEAR INDIVIDUAL BASIN FLOWS

Project Name: OA1140A
Calculated By: NB
Check By: AH
Date: 10/9/2019

PRE-DEVELOPMENT CONDITIONS:

SUB-BASIN DATA					DIRECT RUNOFF	
CONTRIBUTING BASINS	BASIN AREA (acre)	C100	EFFECTIVE AREA (acre)	SUB BASIN Tc (min)	I (in/hr)	SUB BASIN Q (cfs)
PRE	0.97	0.35	0.34	5.00	8.68	2.95
					TOTAL:	2.95

POST-DEVELOPMENT CONDITIONS:

SUB-BASIN DATA					DIRECT RUNOFF	
CONTRIBUTING BASINS	BASIN AREA (acre)	C100	EFFECTIVE AREA (acre)	SUB BASIN Tc (min)	I (in/hr)	SUB BASIN Q (cfs)
A1	0.30	0.95	0.29	5.00	8.68	2.52
A2	0.21	0.72	0.15	5.00	8.68	1.33
A3	0.26	0.83	0.21	5.00	8.68	1.85
B1	0.20	0.39	0.08	5.00	8.68	0.66
					TOTAL:	6.36

Q100= C*I*A

Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Oct 9 2019

12-inch HDPE Storm Drain (Basins A1 & A2), 100-year Storm Event

Invert Elev Dn (ft)	=	36.40
Pipe Length (ft)	=	164.00
Slope (%)	=	0.62
Invert Elev Up (ft)	=	37.41
Rise (in)	=	12.0
Shape	=	Circular
Span (in)	=	12.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Square edge w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

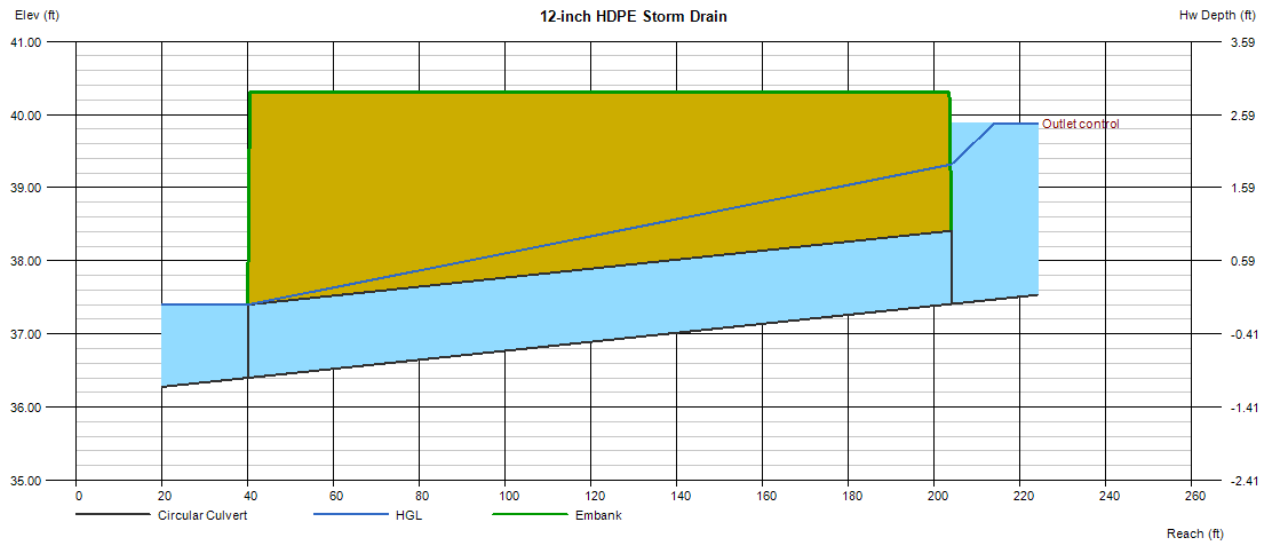
Top Elevation (ft)	=	40.30
Top Width (ft)	=	163.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	3.85
Tailwater Elev (ft)	=	Crown

Highlighted

Qtotal (cfs)	=	3.85
Qpipe (cfs)	=	3.85
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	4.90
Veloc Up (ft/s)	=	4.90
HGL Dn (ft)	=	37.40
HGL Up (ft)	=	39.32
Hw Elev (ft)	=	39.88
Hw/D (ft)	=	2.47
Flow Regime	=	Outlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Oct 9 2019

15-inch HDPE Storm Drain (Basins A1, A2, & A3), 100-year Storm Event

Invert Elev Dn (ft)	=	35.89
Pipe Length (ft)	=	81.00
Slope (%)	=	0.51
Invert Elev Up (ft)	=	36.30
Rise (in)	=	15.0
Shape	=	Circular
Span (in)	=	15.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Square edge w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

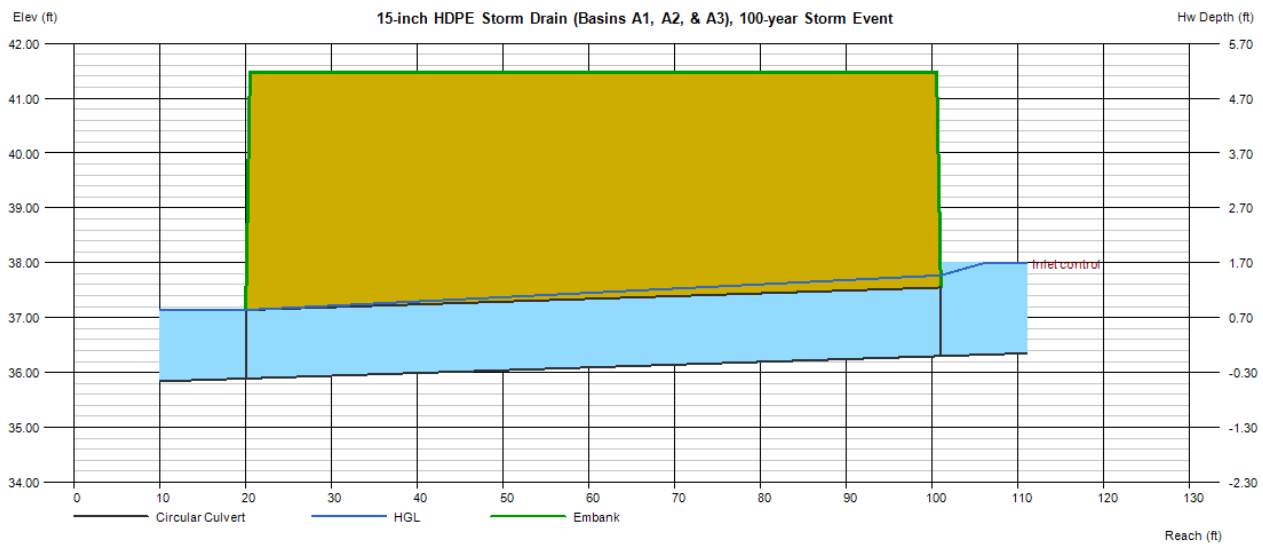
Top Elevation (ft)	=	41.48
Top Width (ft)	=	80.00
Crest Width (ft)	=	10.00

Calculations

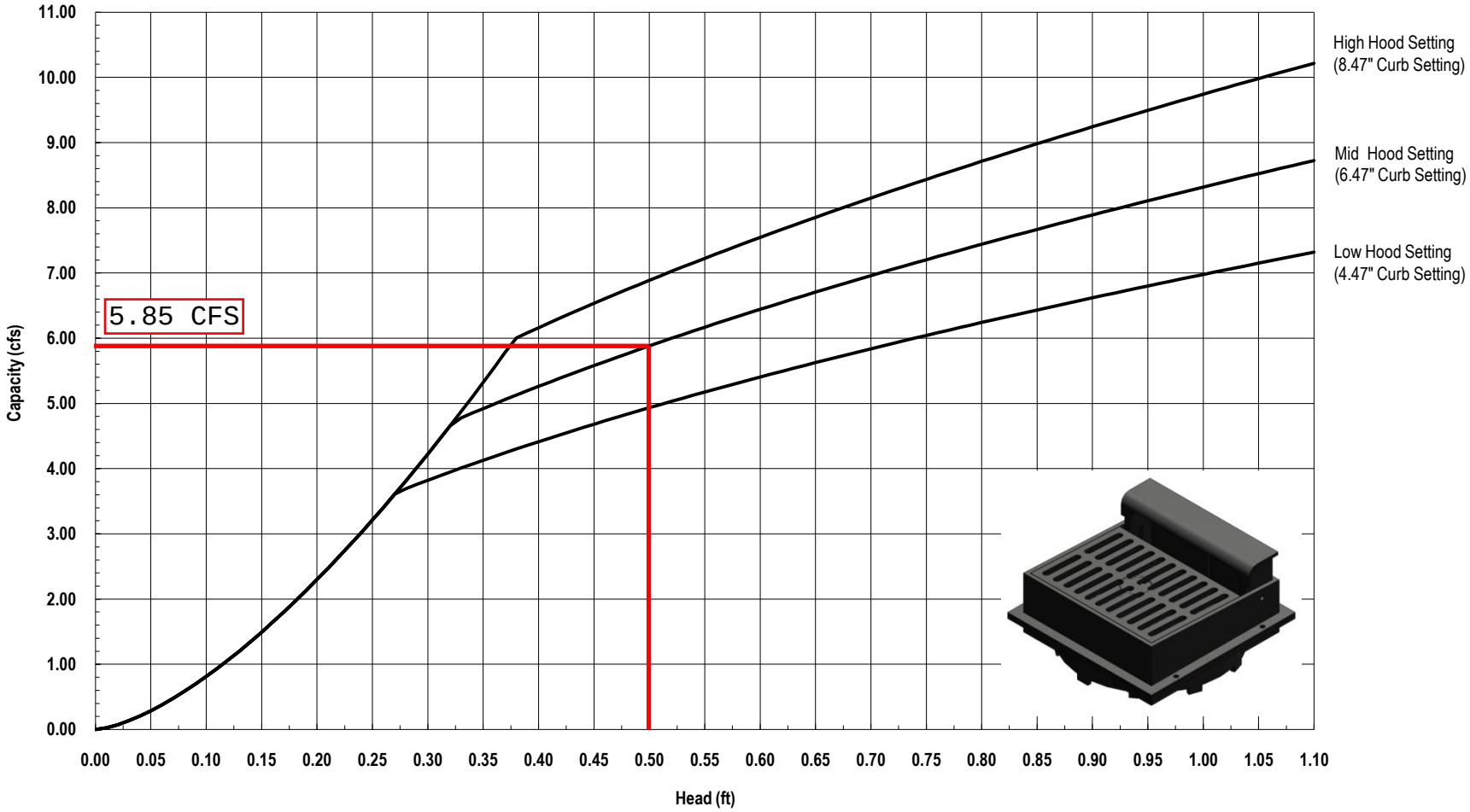
Qmin (cfs)	=	0.00
Qmax (cfs)	=	5.70
Tailwater Elev (ft)	=	Crown

Highlighted

Qtotal (cfs)	=	5.70
Qpipe (cfs)	=	5.70
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	4.65
Veloc Up (ft/s)	=	4.64
HGL Dn (ft)	=	37.14
HGL Up (ft)	=	37.77
Hw Elev (ft)	=	37.99
Hw/D (ft)	=	1.35
Flow Regime	=	Inlet Control

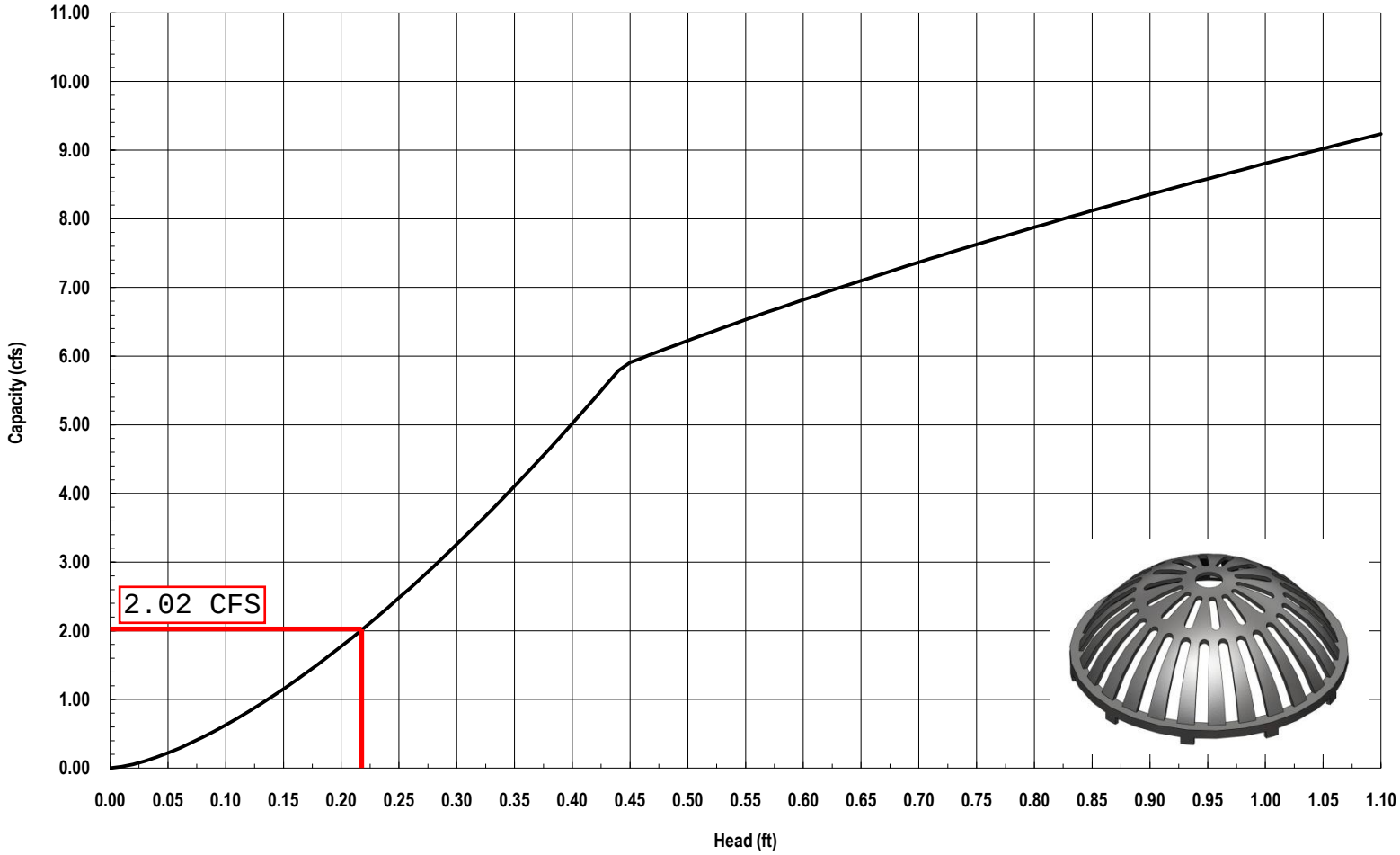


Nyloplast 2' x 2' Curb Inlet Standard Grate Inlet Capacity Chart



Nyloplast®
3130 Verona Avenue • Buford, GA 30518
(866) 888-8479 / (770) 932-2443 • Fax: (770) 932-2490

Nyloplast 24" Dome Grate Inlet Capacity Chart



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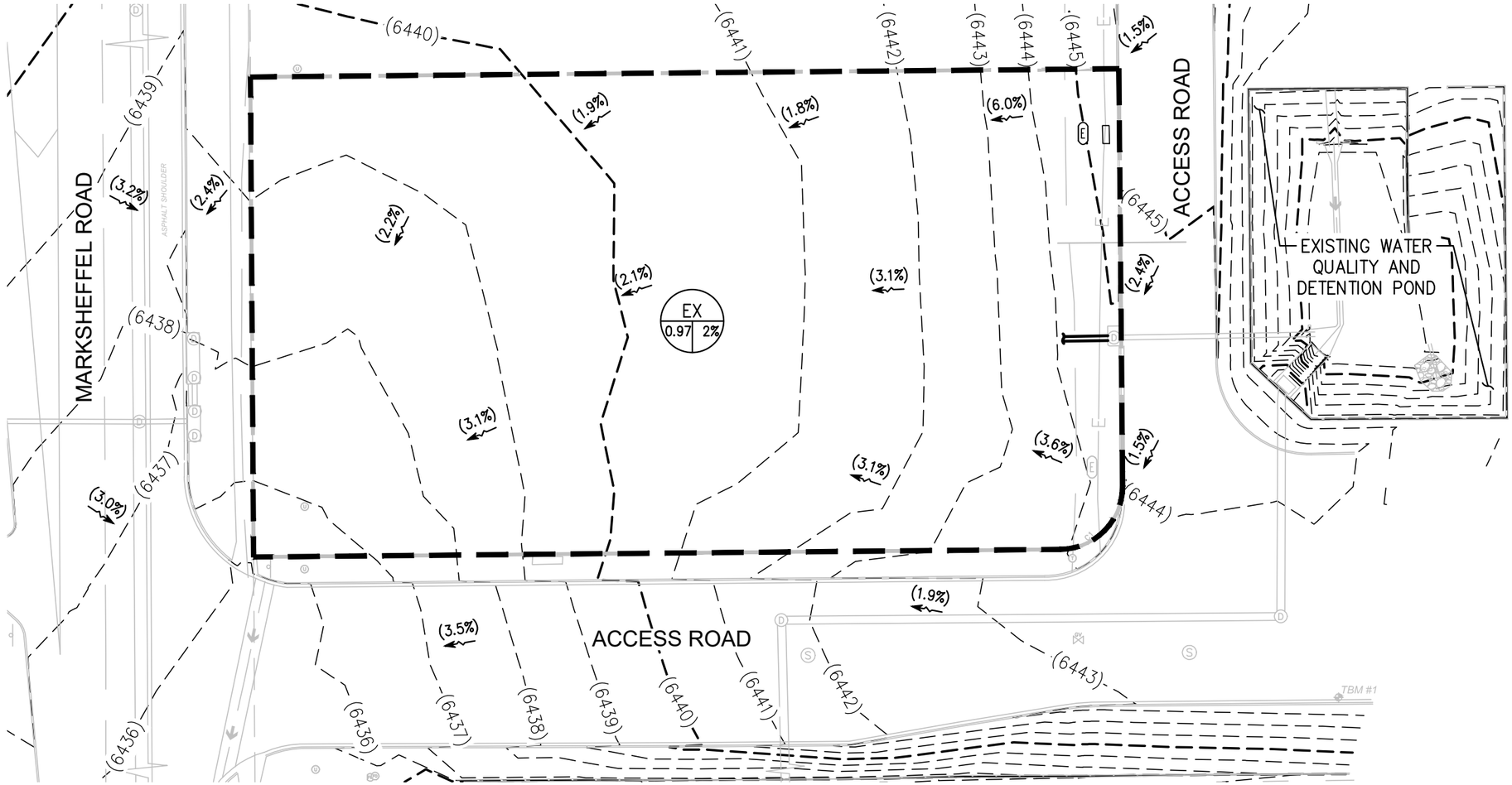


1 PRE-DEVELOPMENT DRAINAGE PLAN

DR1 SCALE: 1" = 40'-0"

0 40

SCALE: 1" = 40

N

DRAINAGE LEGEND

— — (4300) — — EXISTING CONTOUR

(1.0%) EXISTING SLOPE

BASIN LIMITS

A / B C

A = DRAINAGE BASIN

B = BASIN AREA (ACRES)

C = PERCENT IMPERVIOUS

STORMWATER RUNOFF NOTES

SUMMARY RUNOFF TABLE

BASIN ID	CONTRIBUTING AREA (ACRES)	RUNOFF COEFFICIENT	PEAK FLOW 100-YR (CFS)
EXISTING	0.97	0.35	2.95

CRAIG A. SCHNEIDER, AIA
ARCHITECT
1736 East Sunshine, Suite 417
Springfield, Missouri 65804
417.862.0558
Fax: 417.862.3265
e-mail: architect@exterityschneider.com

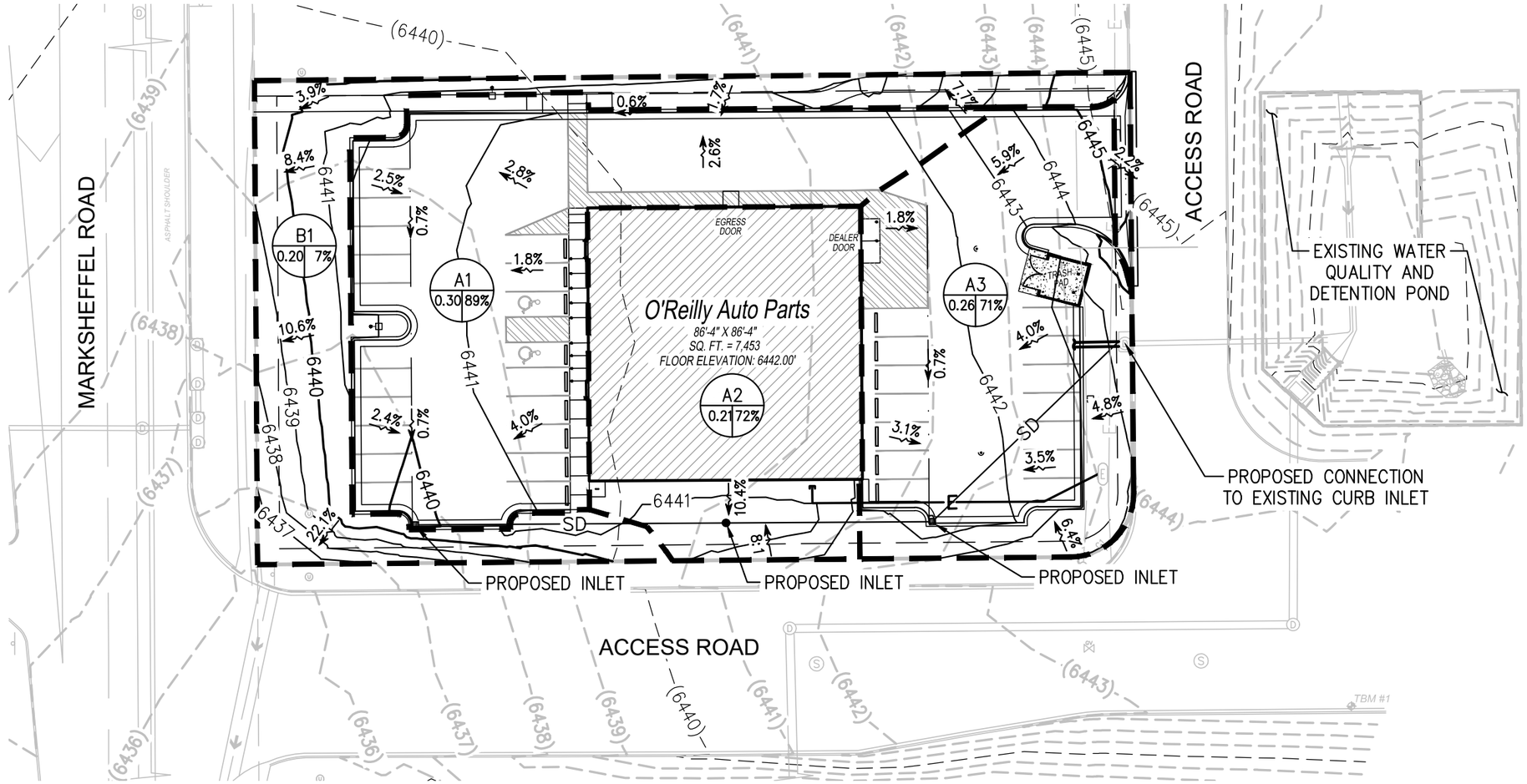
PROJECT:
NEW O'REILLY AUTO PARTS STORE
2417 MARKSHEFFEL RD.
COLORADO SPRINGS, CO (C11)
PRE-DEVELOPMENT DRAINAGE PLAN

O'Reilly AUTO PARTS

CORPORATE OFFICES
233 SOUTH PATTERSON
SPRINGFIELD, MISSOURI 65802
(417) 862-2674 TELEPHONE

COMM #	0000
DATE:	00-00-00
REVISION DATE:	

DR1



1 DR2 POST-DEVELOPMENT DRAINAGE PLAN

SCALE: 1" = 40'-0"

0 40

SCALE: 1" = 40

N

DRAINAGE LEGEND

- (4300) — EXISTING CONTOUR
- 4300 — PROPOSED CONTOUR
- (1.0%) — EXISTING SLOPE
- 2.0% — PROPOSED SLOPE
- BASIN LIMITS
- CONCRETE
- A = DRAINAGE BASIN
- B = BASIN AREA (ACRES)
- C = PERCENT IMPERVIOUS

STORMWATER RUNOFF NOTES

TOTAL LOT AREA: 0.97 ACRES
TOTAL DISTURBED AREA: 0.97 ACRES
PRE-DEVELOPMENT 100-YR RUNOFF VALUE: 2.95 CFS
POST-DEVELOPMENT 100-YR RUNOFF: 6.36 CFS

SUMMARY RUNOFF TABLE

BASIN ID	CONTRIBUTING AREA (ACRES)	5-YR COEFFICIENT	100-YR COEFFICIENT	PEAK FLOW 5-YR (CFS)	PEAK FLOW 100-YR (CFS)
A1	0.30	0.89	0.95	1.40	2.52
A2	0.21	0.60	0.72	0.66	1.33
A3	0.26	0.72	0.83	0.96	1.85
B1	0.20	0.13	0.39	0.13	0.66

CRAIG A. SCHNEIDER, AIA
ARCHITECT
1736 East Sunshine, Suite 417
Springfield, Missouri 65804
417.862.0558
Fax: 417.862.3265
e-mail: architect@exterityschneider.com

PROJECT:
NEW O'REILLY AUTO PARTS STORE
2417 MARKSHEFFEL RD.
COLORADO SPRINGS, CO (C11)
POST-DEVELOPMENT DRAINAGE PLAN

O'Reilly AUTO PARTS
CORPORATE OFFICES
233 SOUTH PATTERSON
SPRINGFIELD, MISSOURI 65802
(417) 862-2674 TELEPHONE

COMM #	0000
DATE:	00-00-00
REVISION DATE:	

DR2