June 11, 2021

Mr. Chris LaRue
Town of Erie Community Development
645 Holbrook Street
Erie, Colorado 80506

Re: Assessment of Impact Report

Dear Mr. LaRue,

Following please find our Assessment of Impact Report for the Rezoning request for the north quarter section of Colliers Hill (Bridgewater PUD Village 1A and 1B). The general purpose for this report is to assess impacts the proposed rezoned parcel would have on the Town, County, Special Districts and utilities and services.

Proposed Project Description

Proposed land uses within Village 1A and 1B of the Bridgewater P.U.D. includes a mix of single-family detached and attached homes ranging in lot size from 2,250 sf to 10,000+ sf. A maximum of 350 single-family detached units and 150 single-family attached units are proposed within the P.U.D. over a total area of 142.25 acres resulting in an approximate density of 3.5 dwelling units per acre. Per the UDC zoning within Suburban Residential (SR) is capped at 3.0 dwelling units per acre, therefore a rezoning request is being made to Low-Density Residential (LR) which permits residential densities between 3.0 and 5.0 dwelling units per acres.

The proposed LR zoning classification is consistent with the majority of the Colliers Hill (Bridgewater) community, except for a small portion located north of the existing railroad which is currently zoned Estate Residential (ER). This area will remain as ER zoning and is proposed as HOA-owned open space.

General Project Information

Current Zoning – Suburban Residential (SR)
Proposed Zoning – Low Density Residential (LR)
Jurisdictions applicable to this parcel – County of Weld, Town of Erie
Special Districts applicable to this parcel –

- Boulder Valley Conservation
- Colliers Hill Metropolitan District 3
- Town of Erie
- High Plains Library
- Mountain View Fire Protection District
- Northern Colorado Water District
- RTD
- School District RE1J-Longmont
- Weld County

Known Utility Service Providers –

- United Power (electric)
- Xcel Energy (gas)
- Town of Erie (water and sewer)
- Additional servicers may be used for telephone, internet, etc. by the individual homeowner

Mineral Rights

There are many known surface use agreements with the community. Copies of these surface use agreements are provided with this application. Many of the oil and gas operations areas originally approved with the Bridgewater P.U.D. have been renegotiated and are planned to be capped, abandoned, and relocated west of the property, near the southwestern portion of the southeastern quarter of Section 8/ Village 1A and 1B.

Assessment

There are no known negative impacts on the County, Town, Special Districts, or affiliated service providers as a result of the rezoning request. All future development proposed within this parcel is consistent with the intent of the existing Town of Erie Comprehensive Plan for LDR land uses, Bridgewater PUD, and associated Annexation Agreement(s). Services to the property are found to be sufficient and are expected as a continuance from the existing Colliers Hill community to the south. Updated reports outlining compliance with the master reports for the community will be submitted with future entitlement applications for review. In addition, referral agencies will be notified for additional comment with future applications and the property is subject to future Development Agreements with the Town of Erie.

We hope that this provides a comprehensive summary of the request for rezoning. Feel free to contact me directly should you have any comments, questions and/or requests for additional information.

Sincerely,
Norris Design

Samantha Crowder
Senior Associate

ALTA/NSPS LAND TITLE SURVEY
TRACTS 18 & 19 BRIDGEWATER MASTER SUBDIVISION
(FUTURE COLLIERS HILL FILING NO. 6)

LOCATED IN THE SOUTHEAST QUARTER OF SECTION 8,
TOWNSHIP 1 NORTH, RANGE 68 WEST OF THE 6TH PRINCIPAL MERIDIAN,
TOWN OF ERIE, COUNTY OF WELD, STATE OF COLORADO

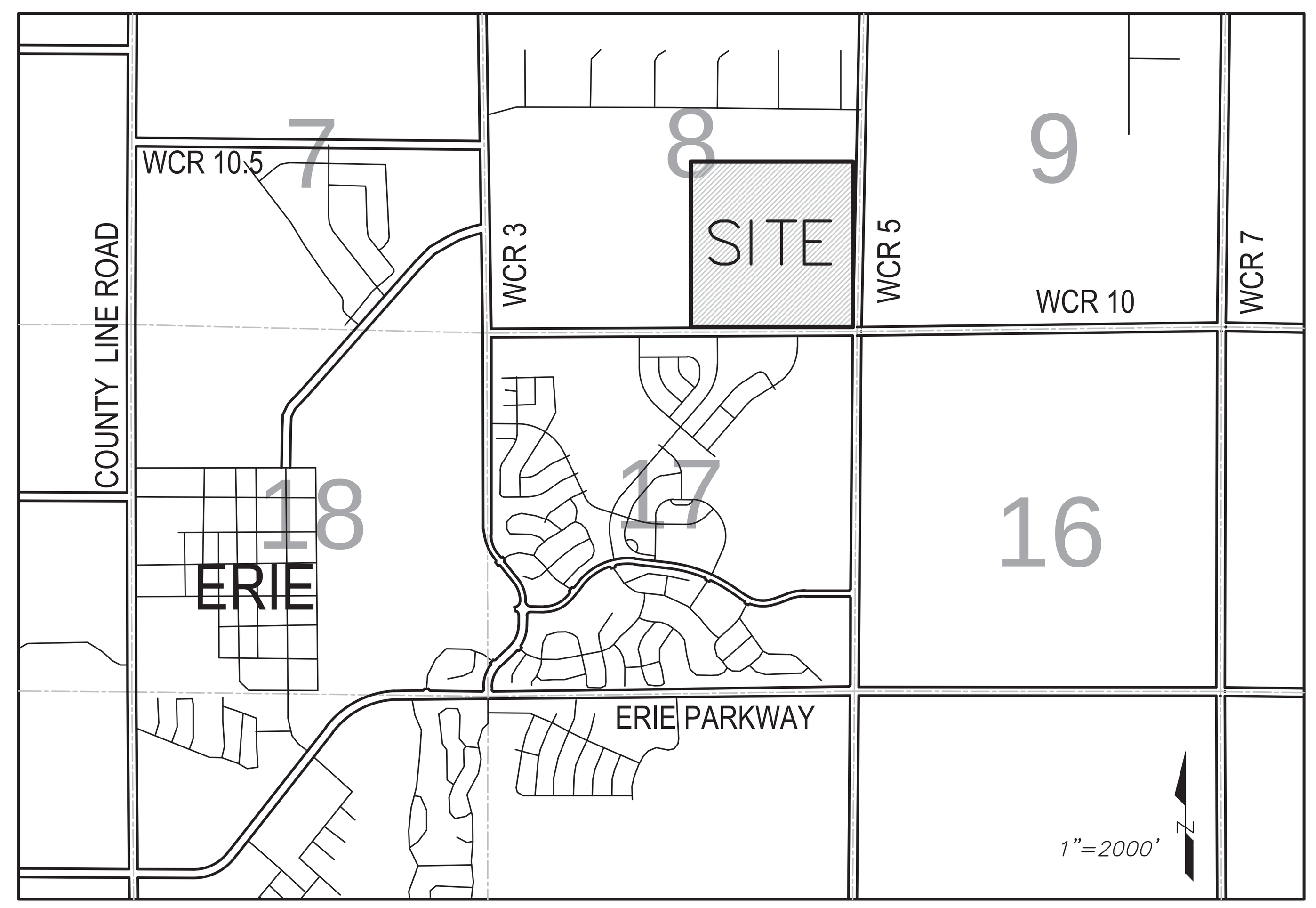
COMMITMENT NOTES:

THIS SURVEY IS BASED UPON TITLE COMMITMENT NO. NCS-870785-CO, PREPARED BY FIRST AMERICAN TITLE INSURANCE COMPANY, WITH AN EFFECTIVE DATE OF 08/06/20. THIS SURVEY DOES NOT CONSTITUTE A TITLE SEARCH OR EASEMENT RESEARCH BY HURST & ASSOCIATES. RATHER, ALL INFORMATION REGARDING TITLE AND EASEMENT MATTERS SHOULD BE OBTAINED FROM THE TITLE COMMITMENT. UNLESS OTHERWISE NOTED, ALL EXCEPTIONS LISTED AFFECT THE SUBJECT PROPERTY BY BEING INCLUDED IN DESCRIPTIONS CONTAINED IN DOCUMENT.

(EXCEPTIONS 1 THROUGH 5 ARE STANDARD EXCEPTIONS AND CANNOT BE SHOWN)

SCHEDULE B SECTION 2 EXCEPTIONS

EXC. NO.	DOCUMENT	DATE	RECEPTION NO.	NOTES
6	COMMISSIONER'S TRANSCRIPT	10/11/1889	B86 P273	DOES NOT AFFECT; FOR RIGHTS OF WAY 30' EACH SIDE SECTION LINE; ROW IS NOW WIDER
7	EASEMENT DEED	10/12/1971	1576620	DOES NOT AFFECT; NOW LOCATED IN CR5 AND CR10 ROW
8	MINERAL DEED	11/30/1972	1602712	NOTHING TO SHOW
9	EASEMENT DEED	02/13/1986	2042899	EASEMENT SHOWN
10	SPECIAL WARRANTY DEED	11/17/2000	2807516	NOTHING TO SHOW
11	AGREEMENT	11/17/2000	2807515	NOTHING TO SHOW
12	MEMORANDUM OF SUA	09/29/2003	3110572	NOTHING TO SHOW
13	MEMORANDUM OF SUA CORRECTED MEMO OF SUA	08/25/2005 11/01/2010	3316658 3729056	NOTHING TO SHOW
14	MEMORANDUM OF SUA CORRECTED MEMO OF SUA	03/13/2007 11/01/2010	3461612 3729057	NOTHING TO SHOW
15	RIGHT OF WAY GRANT AMENDMENT	09/20/2007 05/13/2014	3505741 4015765	RIGHT OF WAY DESCRIBED IN GRANT (AND R# 3600584–EXCEPTION 23) REPLACED BY AMENDMENT (SHOWN)
16	ORDINANCE NO. 30–2007	11/19/2007	3518315	NOTHING TO SHOW
17	ORDINANCE NO. 29–2007	11/19/2007	3518316	NOTHING TO SHOW
18	BRIDGEWATER ANNEX AGMT FIRST AMENDMENT SECOND AMENDMENT THIRD AMENDMENT PARTIAL ASSIGNMENT	11/19/2007 12/30/2010 10/12/2011 01/23/2013 06/13/2013	3518317 3741841 3798317 3904988 3955793	NOTHING TO SHOW
19	GRANT OF PERMANENT AVIGATION EASEMENT	11/19/2007	3518318	CANNOT SHOW, BLANKET EASEMENT
20	BRIDGEWATER ANNEX. MAP	11/19/2007	3518319	NOTHING TO SHOW
21	BRIDGEWATER ZONING MAP AMENDMENT #1	11/19/2007 08/31/2011	3518320 3789471	NOTHING TO SHOW, ZONES TRACT 18 AS LR (LOW DENSITY RESIDENTIAL) AND TRACT 19 AS ER (ESTATE RESIDENTIAL)
22	BRIDGEWATER PUD OVERLAY MAP AMENDMENT #1 AMENDMENT #2 AMENDMENT #3 AMENDMENT #4	11/19/2007 08/31/2011 05/29/2013 11/03/2015 07/23/2019	3518321 3789472 3935464 4155346 4508046	NOTHING TO SHOW; SHOWS TRACT 18 TO BE SFD (SINGLE FAMILY DETACHED) AND TRACT 19 TO BE OPEN SPACE
23	RIGHT OF WAY GRANT	01/21/2009	3600584	DESCRIPTION OF RIGHT OF WAY HAS BEEN CHANGED BY AMENDMENT RECORDED AT R# 4015765 (SEE EXCEPTION NO. 15)
24	QUITCLAIM DEED	04/14/1971	1565713	NOTHING TO SHOW
25	OIL AND GAS LEASE AFFIDAVIT	11/30/1972 01/11/1979	1602713 1778417	NOTHING TO SHOW
26	ORDER AND DECREE	06/24/2008	3562681	NOTHING TO SHOW
27	ORDINANCE NO. 08–2011	08/31/2011	3789473	NOTHING TO SHOW
28	ORDINANCE NO. 09–2011	08/31/2011	3789474	NOTHING TO SHOW
29	SURFACE USE AGREEMENT FIRST AMENDMENT	10/18/2011 04/25/2019	3799568 4484091	OGOAS SHOWN
30	BRIDGEWATER MASTER PLAT ORDINANCE NO. 18–2015	12/13/2011 06/22/2015	3811552 4117798	NO EASEMENTS CREATED BY PLAT; 100' SETBACK ADJACENT TO WEST LINE SHOWN
31	ORDERS FOR CONDITIONAL INCLUSION	03/08/2012 03/13/2012	3830699 3831541	NOTHING TO SHOW
32	MASTER DECLARATION COVENANT TO ANNEX PARTIAL ASSIGNMENT FIRST AMENDMENT	05/29/2013 05/29/2013 01/04/2017 04/28/2014	3935465 3935454 4267367 4012251	NOTHING TO SHOW
33	COVENANT OF RIGHTS	08/13/2013	3955789	NOTHING TO SHOW
34	RIGHT OF WAY GRANT AMENDMENT TO ROW GRANT	03/20/2017 03/03/2020	4286866 4571526	RIGHT OF WAY DESCRIBED IN ROW GRANT CHANGED BY AMENDMENT (SHOWN)
35	REQUEST FOR NOTIFICATION AMENDED REQUEST	06/19/2019 07/17/2019	4498649 4506252	NOTHING TO SHOW
36	EXISTING LEASES AND TENANCIES	–	–	NOTHING TO SHOW



VICINITY MAP

GENERAL NOTES:

1. NOTICE: ACCORDING TO COLORADO LAW, YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF THE CERTIFICATION SHOWN HEREON.

2. BASIS OF BEARINGS: BEARINGS ARE BASED ON THE EAST LINE OF THE SOUTHEAST QUARTER OF SECTION 8: S00°49'07"E BETWEEN THE EAST QUARTER CORNER AND SOUTHEAST CORNER (BOTH 2.5" ALUMINUM CAPS, LS 23501, 1993).

3. FOUND/SET PROPERTY CORNERS SHOWN HEREON.

4. NO BUILDINGS EXISTING ON THE SURVEYED PROPERTY.

5. THERE IS NO POSTED ADDRESS. WELD COUNTY ONLINE PROPERTY INFORMATION MAP HAS NO ADDRESS INFORMATION.

6. ABOVE GROUND UTILITIES ARE SHOWN. ADDITIONAL UTILITIES MAY EXIST THAT WERE NOT OBSERVED DUE TO GRASSES.

7. TOTAL GROSS AREA OF PARCEL: 151.72 ACRES.

8. THERE ARE NO SUBSTANTIAL FEATURES OR PARKING AREAS ON SUBJECT PROPERTY.

9. ALL DISTANCES ARE U.S. SURVEY FEET.

10. THE BRIDGEWATER MASTER SUBDIVISION PLAT SHOWS A 100' SETBACK ALONG THE WESTERLY LINES OF TRACTS 18 AND 19 PER A SUBSIDENCE INVESTIGATION REPORT.

11. A REGIONAL TRANSPORTATION DISTRICT RIGHT OF WAY PLAN RECORDED 02/10/2017 AT RECEPTION NO. 4277473 WAS USED IN THE PREPARATION OF THIS SURVEY. THE PLAN SHOWS THE RTD ROW MONUMENTATION ALONG THE NORTHERLY LINE OF BRIDGEWATER TRACT 18 AND THE SOUTHERLY LINE OF TRACT 19,

PARCEL DESCRIPTION:

PARCEL 1:

TRACT 18 OF "BRIDGEWATER MASTER SUBDIVISION", TOWN OF ERIE, COUNTY OF WELD, STATE OF COLORADO,

EXCEPTING THEREFROM THE FOLLOWING FOUR PARCELS CONVEYED IN DEED RECORDED AUGUST 13, 2013 AT RECEPTION NO. 3955791 IN THE RECORDS OF WELD COUNTY, COLORADO:

PARCEL 11A:

A PARCEL OF LAND LOCATED IN TRACT 18 OF "BRIDGEWATER MASTER SUBDIVISION", BEING IN THE SOUTHEAST QUARTER OF SECTION 8, TOWNSHIP 1 NORTH, RANGE 68 WEST OF THE 6TH P.M., TOWN OF ERIE, COUNTY OF WELD, STATE OF COLORADO, DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWESTERLY CORNER OF SAID TRACT 18;
THENCE ALONG THE NORTHWESTERLY LINE OF SAID TRACT 18 (BASIS OF BEARINGS) THE FOLLOWING TWO COURSES:
1) N42°43'40"E, 467.34 FEET;
2) 196.70 FEET ALONG THE ARC OF A TANGENT CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 1,858.50 FEET, A CENTRAL ANGLE OF 06°03'50", AND A CHORD BEARING N45°45'35"E, 196.60 FEET TO THE POINT OF BEGINNING;
THENCE CONTINUING ALONG THE NORTHWESTERLY LINE OF TRACT 18 THE FOLLOWING COURSE: 259.39 FEET ALONG THE CURVE, SAID CURVE HAVING A RADIUS OF 200.00 FEET, A CENTRAL ANGLE OF 07°59'48", AND A CHORD BEARING N52°47'24"E, 259.18 FEET;
THENCE 974.68 FEET ALONG THE ARC OF A NON–TANGENT CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 200.00 FEET, A CENTRAL ANGLE OF 279°13'35", AND A CHORD BEARING S52°47'24"W, 259.18 FEET TO THE POINT OF BEGINNING.

PARCEL 11B:

A CIRCULAR PARCEL OF LAND HAVING A RADIUS OF 200.00 FEET LOCATED IN TRACT 18 OF "BRIDGEWATER MASTER SUBDIVISION", BEING IN THE SOUTHEAST QUARTER OF SECTION 8, TOWNSHIP 1 NORTH, RANGE 68 WEST OF THE 6TH P.M., TOWN OF ERIE, COUNTY OF WELD, STATE OF COLORADO, THE CENTER OF WHICH IS LOCATED N46°04'39"E, 889.25 FEET FROM THE SOUTHWESTERLY CORNER OF SAID TRACT 18 AND N73°24'50"W, 2,007.36 FEET FROM THE SOUTHEASTERLY CORNER OF SAID TRACT 18.

BASIS OF BEARINGS IS THE SOUTHERLY LINE OF SAID TRACT 18, BEING N89°01'14"E, 2,564.73 FEET BETWEEN THE SOUTHWESTERLY CORNER OF TRACT 18 AND THE SOUTHEASTERLY CORNER OF TRACT 18.

PARCEL 11C:

A PARCEL OF LAND LOCATED IN TRACT 18 OF "BRIDGEWATER MASTER SUBDIVISION", BEING IN THE SOUTHEAST QUARTER OF SECTION 8, TOWNSHIP 1 NORTH, RANGE 68 WEST OF THE 6TH P.M., TOWN OF ERIE, COUNTY OF WELD, STATE OF COLORADO, DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEASTERLY CORNER OF SAID TRACT 18;
THENCE S00°49'09"W, 614.51 FEET ALONG THE EASTERLY LINE OF SAID TRACT 18 (BASIS OF BEARINGS);
THENCE 43.02 FEET ALONG THE ARC OF A NON–TANGENT CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 200.00 FEET, A CENTRAL ANGLE OF 12°19'27", AND A CHORD BEARING S83°50'16"W, 42.94 FEET;
THENCE S90°00'00"W, 50.00 FEET;
THENCE 97.49 FEET ALONG THE ARC OF A TANGENT CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 200.00 FEET, A CENTRAL ANGLE OF 27°55'46", AND A CHORD BEARING N76°02'07"W, 96.53 FEET;
THENCE N62°04'14"W, 403.72 FEET;
THENCE 216.67 FEET ALONG THE ARC OF A TANGENT CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 200.00 FEET, A CENTRAL ANGLE OF 62°04'14", AND A CHORD BEARING N31°02'07"W, 206.23 FEET;
THENCE N00°00'00"E, 16.00 FEET;
THENCE 169.10 FEET ALONG THE ARC OF A NON–TANGENT CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 200.00 FEET, A CENTRAL ANGLE OF 48°26'41", AND A CHORD BEARING N24°13'20"E, 164.11 FEET;
THENCE N48°26'41"E, 172.87 FEET TO THE NORTHERLY LINE OF SAID TRACT 18;
THENCE S83°46'14"E, 464.22 FEET ALONG THE SAID NORTHERLY LINE OF TRACT 18 TO THE POINT OF BEGINNING.

PARCEL 11D:

A PARCEL OF LAND LOCATED IN TRACT 18 OF "BRIDGEWATER MASTER SUBDIVISION", BEING IN THE SOUTHEAST QUARTER OF SECTION 8, TOWNSHIP 1 NORTH, RANGE 68 WEST OF THE 6TH P.M., TOWN OF ERIE, COUNTY OF WELD, STATE OF COLORADO, DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHEASTERLY CORNER OF SAID TRACT 18 ALSO BEING THE NORTHERLY POINT OF CURVATURE OF THE NORTHWESTERLY CORNER OF THE INTERSECTION OF COUNTY ROAD 5 AND COUNTY ROAD 10 FROM WHENCE THE NORTHEASTERLY CORNER OF SAID TRACT 18 LIES N00°49'09"E, 2,350.26 FEET (BASIS OF BEARINGS)
THENCE N46°53'21"W, 1,093.59 FEET TO THE POINT OF BEGINNING;

THENCE S02°24'09"E, 17.18 FEET;
THENCE 647.17 FEET ALONG THE ARC OF A TANGENT CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 206.00 FEET, A CENTRAL ANGLE OF 180°00'00", AND A CHORD BEARING S87°35'51"W, 412.00 FEET;
THENCE N02°24'09"W, 17.18 FEET;
THENCE 120.57 FEET ALONG THE ARC OF A TANGENT CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 206.00 FEET, A CENTRAL ANGLE OF 33°32'09", AND A CHORD BEARING N14°21'55"E, 118.86 FEET;
THENCE 264.33 FEET ALONG THE ARC OF A NON–TANGENT CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 200.00 FEET, A CENTRAL ANGLE OF 75°43'28", AND A CHORD BEARING N18°15'37"E, 245.51 FEET;
THENCE 604.93 FEET ALONG THE ARC OF A NON–TANGENT CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 200.00 FEET, A CENTRAL ANGLE OF 173°18'00", AND A CHORD BEARING S47°18'52"E, 399.32 FEET;
THENCE 61.64 FEET ALONG THE ARC OF A NON–TANGENT CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 206.00 FEET, A CENTRAL ANGLE OF 17°08'41", AND A CHORD BEARING S10°58'30"E, 61.41 FEET TO THE POINT OF BEGINNING.

PARCEL 2:

TRACT 19 OF "BRIDGEWATER MASTER SUBDIVISION", TOWN OF ERIE, COUNTY OF WELD, STATE OF COLORADO,

EXCEPTING THEREFROM THE FOLLOWING PARCEL CONVEYED IN DEED RECORDED AUGUST 13, 2013 AT RECEPTION NO. 3955791 IN THE RECORDS OF WELD COUNTY, COLORADO:

A PARCEL OF LAND LOCATED IN TRACT 19 OF "BRIDGEWATER MASTER SUBDIVISION", BEING IN THE SOUTHEAST QUARTER OF SECTION 8, TOWNSHIP 1 NORTH, RANGE 68 WEST OF THE 6TH P.M., TOWN OF ERIE, COUNTY OF WELD, STATE OF COLORADO, DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEASTERLY CORNER OF SAID TRACT 19
THENCE N83°46'14"W, 364.03 FEET ALONG THE SOUTHERLY LINE OF SAID TRACT 19 (BASIS OF BEARINGS);
THENCE N48°26'41"E, 46.43 FEET;
THENCE 166.80 FEET ALONG THE ARC OF A TANGENT CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 200.00 FEET, A CENTRAL ANGLE OF 47°47'05", AND A CHORD BEARING N72°20'13"E, 162.01 FEET;
THENCE S83°46'14"E, 154.00 FEET;
THENCE 21.39 FEET ALONG THE ARC OF A TANGENT CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 200.00 FEET, A CENTRAL ANGLE OF 06°07'37", AND A CHORD BEARING S80°42'26"E, 21.38 FEET TO THE EASTERLY LINE OF TRACT 19;
THENCE S00°49'09"W, 99.30 FEET ALONG THE SAID EASTERLY LINE OF TRACT 19 TO THE POINT OF BEGINNING.

PARCEL 3:

THE FOLLOWING FOUR (4) PARCELS OF LAND LOCATED IN TRACT 18 OF "BRIDGEWATER MASTER SUBDIVISION", TOWN OF ERIE, COUNTY OF WELD, STATE OF COLORADO:

ABOVE DESCRIBED PARCELS 11A, 11B, 11C AND 11D.

PARCEL 4:

A PARCEL OF LAND LOCATED IN TRACT 19 OF "BRIDGEWATER MASTER SUBDIVISION", BEING IN THE SOUTHEAST QUARTER OF SECTION 8, TOWNSHIP 1 NORTH, RANGE 68 WEST OF THE 6TH P.M., TOWN OF ERIE, COUNTY OF WELD, STATE OF COLORADO, DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEASTERLY CORNER OF SAID TRACT 19
THENCE N83°46'14"W, 364.03 FEET ALONG THE SOUTHERLY LINE OF SAID TRACT 19 (BASIS OF BEARINGS);
THENCE N48°26'41"E, 46.43 FEET;
THENCE 166.80 FEET ALONG THE ARC OF A TANGENT CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 200.00 FEET, A CENTRAL ANGLE OF 47°47'05", AND A CHORD BEARING N72°20'13"E, 162.01 FEET;
THENCE S83°46'14"E, 154.00 FEET;
THENCE 21.39 FEET ALONG THE ARC OF A TANGENT CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 200.00 FEET, A CENTRAL ANGLE OF 06°07'37", AND A CHORD BEARING S80°42'26"E, 21.38 FEET TO THE EASTERLY LINE OF TRACT 19;
THENCE S00°49'09"W, 99.30 FEET ALONG THE SAID EASTERLY LINE OF TRACT 19 TO THE POINT OF BEGINNING.

SURVEY CERTIFICATION:

CERTIFIED TO:

DAYBREAK RECOVERY ACQUISITIONS LLC
COLLIERS HILL METROPOLITAN DISTRICT NO. 3
FIRST AMERICAN TITLE INSURANCE COMPANY

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 1, 2, 4, 8 OF TABLE A THEREOF. THE FIELDWORK WAS COMPLETED 08/25/20.

DATE OF PLAT OR MAP: 08/27/20

COLORADO LICENSED PROFESSIONAL LAND SURVEYOR
BO BAIZE
08/27/20
37990

FOR AND ON BEHALF OF HURST AND ASSOCIATES:
BO BAIZE, COLORADO PLS NO. 37990
EMAIL ADDRESS: bo@hurst.design

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DESCRIPTION	DATE	BY

HURST & ASSOCIATES, INC.
303.449.9105

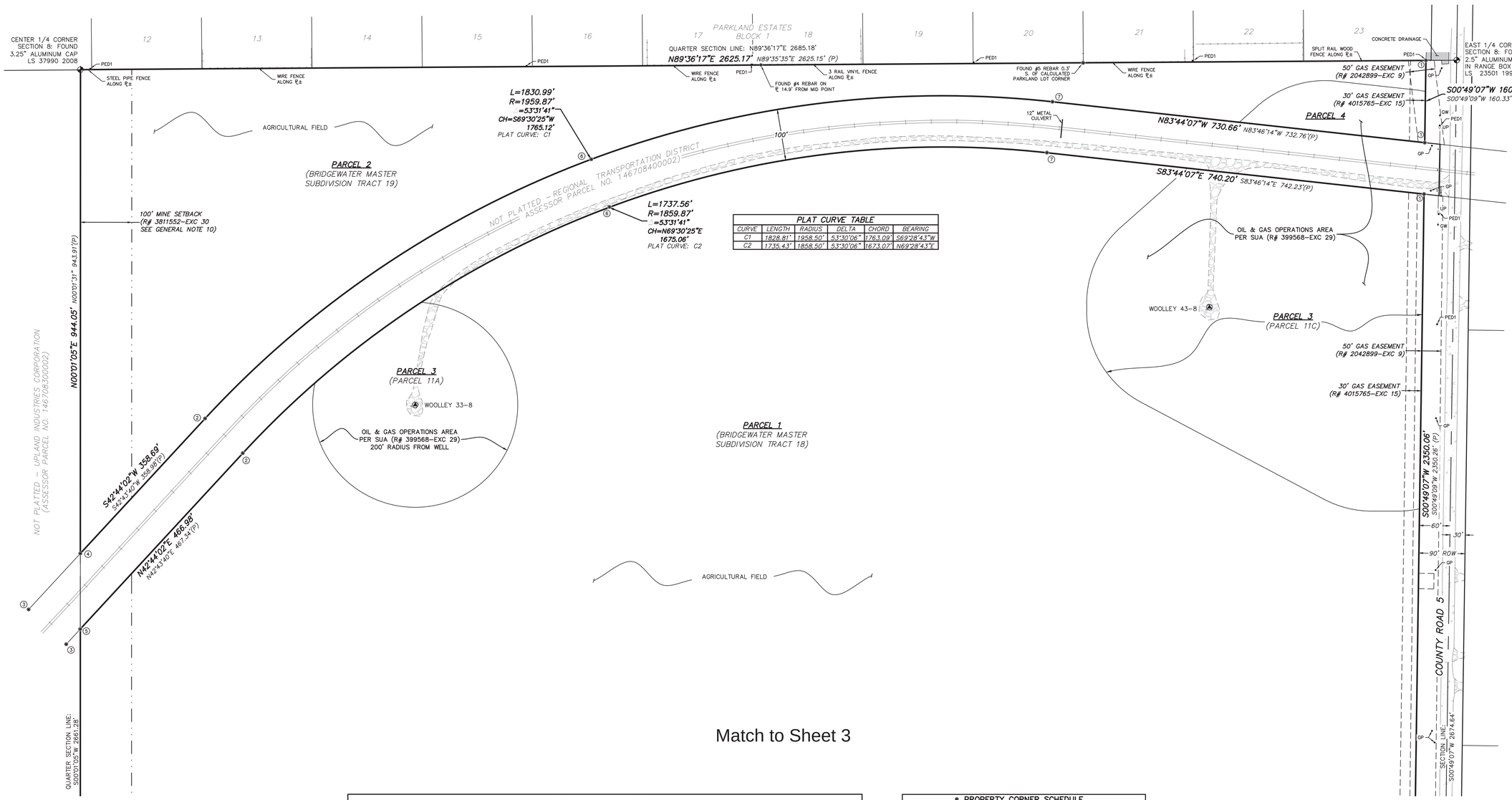
HURST
CIVIL ENGINEERING
PLANNING
SURVEYING

ALTA/NSPS LAND TITLE SURVEY
TR 18 & 19 BRIDGEWATER
(FUTURE COLLIERS HILL FIL NO 6)
ERIE, COLORADO

DRAWN BY: BO
DESIGNED BY:
APPROVED BY:
JOB NUMBER: 2527-02
DATE: 08/27/20
SCALE: N/A
SHEET NO: 1 OF 3

ALTA/NSPS LAND TITLE SURVEY
TRACTS 18 & 19 BRIDGEWATER MASTER SUBDIVISION
(FUTURE COLLIERS HILL FILING NO. 6)

SHEET 2 OF 3



Match to Sheet 3

LEGEND

Water Manhole	GP	Gas Pipeline Post	Overhead Telephone Line
Light Pole (with Electric Pullbox)	GW	Guy Wire	Asphalt
Fire Hydrant	PED1	Telephone Pedestal	Concrete
Water Valve	PED2	CATV Pedestal	Dirt/Gravel
Flared End Section	SIGN	Community Sales Sign	
Wellhead (with name)	TR	Transformer	

PROPERTY CORNER SCHEDULE

1	SET 1" PLASTIC CAP ON 18" #4 REBAR, LS 37990
2	FOUND 1" PLASTIC CAP, LS 37990
3	FOUND 3.25" RTD ALUMINUM CAP, LS 24942
4	FOUND #4 REBAR, NO CAP; ADD 1" PLASTIC CAP, LS 37990
5	FOUND 1" PLASTIC CAP, LS 37990 0.2' SOUTH OF CORNER; FOUND 1.25" ALUMINUM CAP, LS 38302 1.4' NORTH OF CORNER
6	FOUND 3.25" RTD ALUMINUM CAP, LS 24942 AT CORNER; 1" PLASTIC CAP, LS 37990 1.3' SOUTHWEST OF CORNER ON LINE
7	FOUND 3.25" RTD ALUMINUM CAP, LS 24942 AT CORNER; 1" PLASTIC CAP, LS 37990 2.15' NORTHWEST OF CORNER ON LINE

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

SURVEYORS STAMP:
COLORADO LICENSED
BO BAIZE
08/27/20
37990
PROFESSIONAL LAND SURVEYOR

HURST & ASSOCIATES, INC.
1265 S Public Road, Suite B
Lafayette, CO 80026
303.449.9105

HURST
CIVIL ENGINEERING
PLANNING
SURVEYING

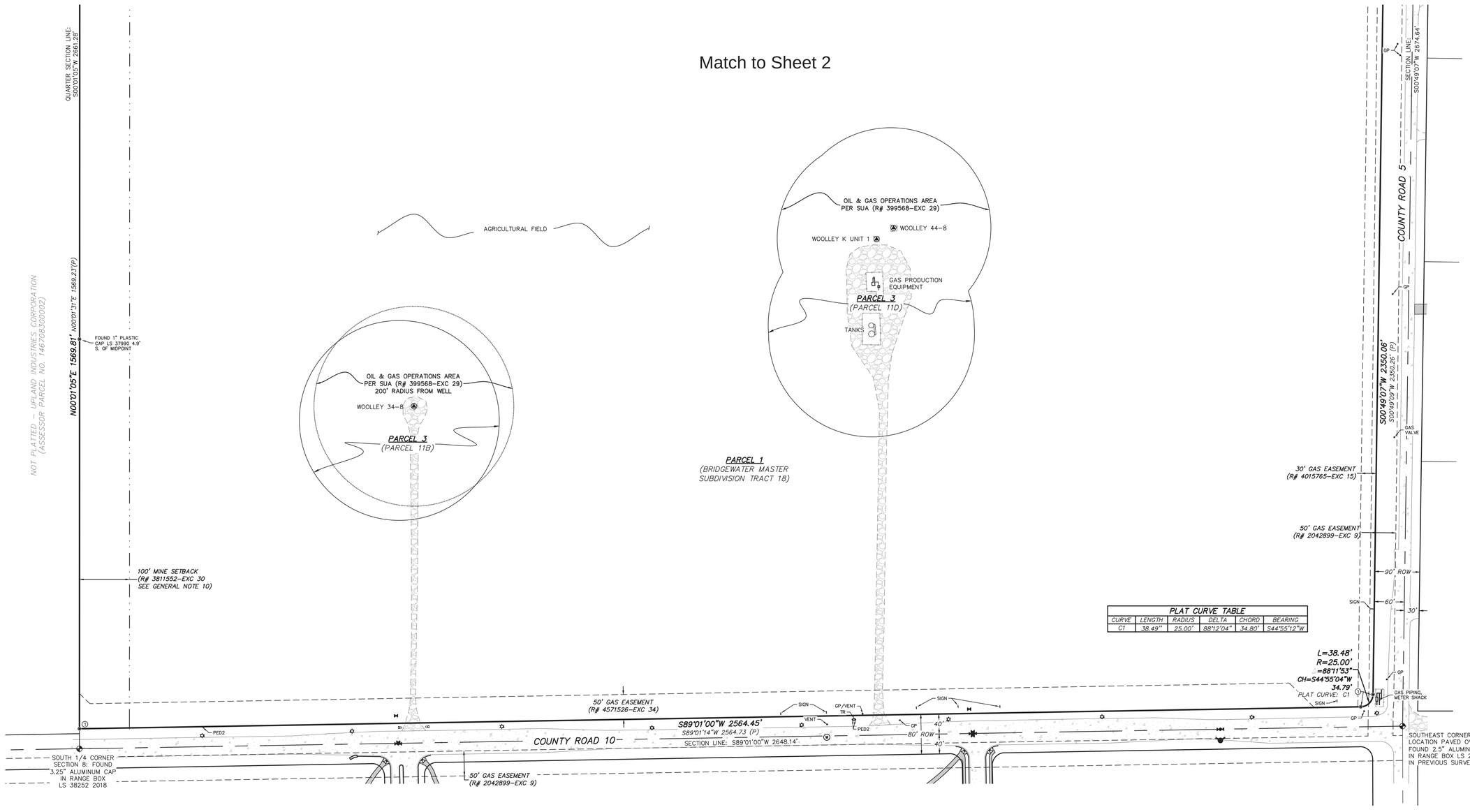
ALTA/NSPS LAND TITLE SURVEY
TR 18 & 19 BRIDGEWATER
(FUTURE COLLIERS HILL FIL NO 6).
ERIE, COLORADO

DRAWN BY: BO
DESIGNED BY:
APPROVED BY:
JOB NUMBER: 2527-02
DATE: 08/27/20
SCALE: 1"=100'
SHEET NO: 2 OF 3
FILE LOCATION: G:\2527\SURVEY\ALTA\SRTBLDG BACH FUT FIL 6 ALTA

ALTA/NSPS LAND TITLE SURVEY
TRACTS 18 & 19 BRIDGEWATER MASTER SUBDIVISION
(FUTURE COLLIERS HILL FILING NO. 6)

SHEET 3 OF 3

Match to Sheet 2



PLAT CURVE TABLE					
CURVE	LENGTH	RADIUS	DELTA	CHORD	BEARING
C1	38.49''	25.00'	88°12'04"	34.80'	S44°55'12"W

LEGEND

Water Manhole	GP	Gas Pipeline Post	Overhead Telephone Line
Light Pole (with Electric Pullbox)	GW	Guy Wire	Asphalt
Fire Hydrant	PED1	Telephone Pedestal	Concrete
Water Valve	PED2	CATV Pedestal	Dirt/Gravel
Flared End Section	SIGN	Community Sales Sign	
Wellhead (with name)	TR	Transformer	

⊕ PROPERTY CORNER SCHEDULE	
1	SET 1" PLASTIC CAP ON 18" #4 REBAR, LS 37990
2	FOUND 1" PLASTIC CAP, LS 37990
3	FOUND 3.25" RTD ALUMINUM CAP, LS 24942
4	FOUND #4 REBAR, NO CAP; ADD 1" PLASTIC CAP, LS 37990
5	FOUND 1" PLASTIC CAP, LS 37990 0.2' SOUTH OF CORNER; FOUND 1.25" ALUMINUM CAP, LS 38302 1.4' NORTH OF CORNER
6	FOUND 3.25" RTD ALUMINUM CAP, LS 24942 AT CORNER; 1" PLASTIC CAP, LS 37990 1.3' SOUTHWEST OF CORNER ON LINE
7	FOUND 3.25" RTD ALUMINUM CAP, LS 24942 AT CORNER; 1" PLASTIC CAP, LS 37990 2.15' NORTHWEST OF CORNER ON LINE

0 50 100 200

1 inch = 100 ft.

SCALE VERIFICATION

BAR IS ONE INCH ON ORIGINAL DRAWING

IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

SURVEYORS STAMP:

COLORADO LICENSED 90 BAYZE 37990 PROFESSIONAL LAND SURVEYOR

08/27/20

HURST

CIVIL ENGINEERING
PLANNING
SURVEYING

HURST & ASSOCIATES, INC.
1265 S Public Road, Suite B
Lafayette, CO 80026
303.449.9105

ALTA/NSPS LAND TITLE SURVEY
TR 18 & 19 BRIDGEWATER
(FUTURE COLLIERS HILL FIL NO 6).
ERIE, COLORADO

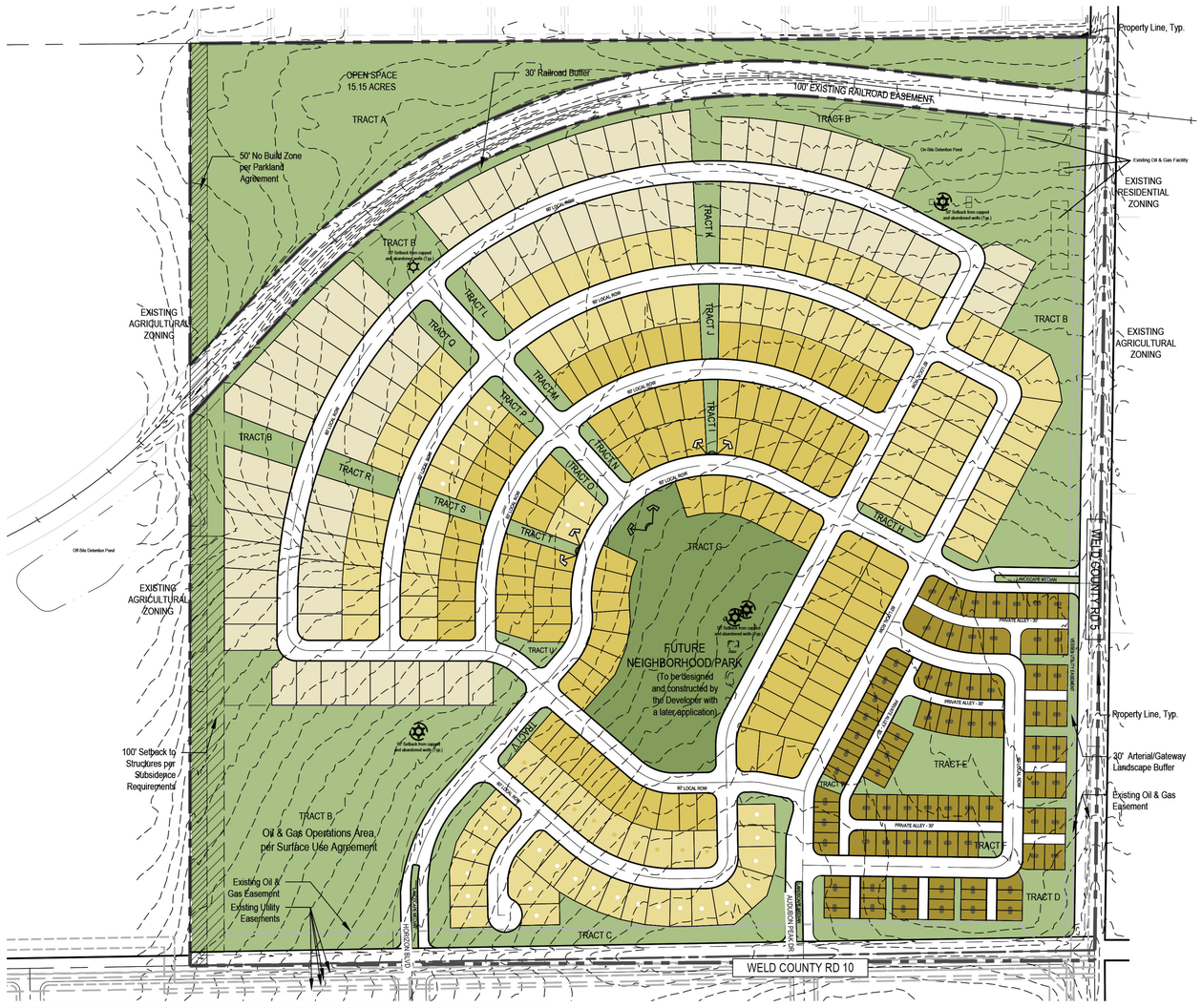
DRAWN BY: BO
DESIGNED BY:
APPROVED BY:
JOB NUMBER: 2527-02
DATE: 08/27/20
SCALE: 1"=100'
SHEET NO: 3 OF 3
FILE LOCATION: G:\2527\SURVEY\ALTA\SPS\DWG\ACH FUT FIL 6 ALTA

Note: The exhibit shown below was previously submitted to the Town of Erie for the Sketch Plan application. A revised, but similar plan will be submitted to the Town in the form of a Preliminary Plat Application in the coming weeks. Additional lots are proposed within Tract B as oil and gas negotiations are coordinated between the land owner and surface rights owners. More detail regarding this negotiation and the revised land use concept will be provided at time of Preliminary Plat.

COLLIERS HILL FILING NO. 6 SKETCH PLAN

TRACT 18 OF "BRIDGEWATER MASTER SUBDIVISION" LOCATED IN SECTION 17, TOWNSHIP 1 NORTH, RANGE 68
WEST OF THE 6TH PRINCIPAL MERIDIAN, TOWN OF ERIE, COUNTY OF WELD, STATE OF COLORADO
158.54 ACRES
SK-001207-2020

LAND USE MAP



LAND SUMMARY CHART

TYPE	AREA (Acres)	% OF TOTAL AREA
RESIDENTIAL LOTS	63.64	40.14%
72' x 130' Single-Family (72 Lots)	-	-
62' x 110' Single-Family (119 Lots)	-	-
52' x 100' Single-Family (117 Lots)	-	-
30' x 75' Sing-Family Paired (142 Lots)	-	-
TRACTS	60.44	38.12%
RIGHTS OF WAY	34.46	21.74%
TOTAL	158.54	100.00%

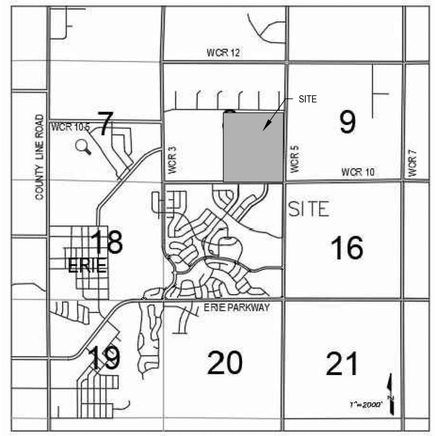
LEGEND

- SKETCH PLAN BOUNDARY
- RESIDENTIAL LOT LINE
- EXISTING EASEMENT
- OIL & GAS WELL 50' RESIDENTIAL SETBACK
- VIEW CORRIDOR

GENERAL NOTES:

1. LAND PLAN IS CONCEPTUAL AND SUBJECT TO CHANGE.
2. THERE ARE NO KNOWN FLOODPLAIN AREAS WITHIN THE PROPOSED SKETCH PLAN BOUNDARY.
3. THERE ARE NO KNOWN WETLAND, RIPARIAN AREAS, STREAMS, LAKES, DITCHES AND/OR LATERALS WITHIN THE SKETCH PLAN BOUNDARY.
4. THERE ARE NO KNOWN GEOLOGICAL HAZARDS, UNDERMINING AND SUBSIDENCE AREAS, AND/OR EXPANSIVE SOILS WITHIN THE PROPOSED SKETCH PLAN BOUNDARY. REFERENCE THE GEOTECHNICAL REPORTS PROVIDED WITH THIS APPLICATION FOR MORE DETAILED INFORMATION.
5. THERE ARE NO KNOWN HISTORICAL OR ARCHAEOLOGICAL SITES WITHIN THE PROPOSED SKETCH PLAN BOUNDARY.
6. THERE ARE NO EXISTING TREES WITHIN THE PROPOSED SKETCH PLAN BOUNDARY.
7. PUBLIC ROADWAYS TO FOLLOW STANDARD TOWN OF ERIE SPECIFICATIONS.

VICINITY MAP



VICINITY MAP

TRACT SUMMARY CHART

TYPE	AREA (Acres)	USE	OWNERSHIP	MAINTENANCE
A	15.15	OPEN SPACE	TOWN OF ERIE	TOWN OF ERIE
B	26.53	LANDSCAPE BUFFER / S.U.A.	H.O.A.	H.O.A.
C	2.73	LANDSCAPE BUFFER	H.O.A.	H.O.A.
D	2.79	LANDSCAPE BUFFER	H.O.A.	H.O.A.
E	1.48	PRIVATE AMENITY	H.O.A.	H.O.A.
F	0.12	LANDSCAPE BUFFER	H.O.A.	H.O.A.
G	7.15	NEIGHBORHOOD PARK	TOWN OF ERIE	TOWN OF ERIE
H	0.15	LANDSCAPE BUFFER	H.O.A.	H.O.A.
I	0.19	LANDSCAPE BUFFER / TRAIL CONNECTION	H.O.A.	H.O.A.
J	0.27	LANDSCAPE BUFFER / TRAIL CONNECTION	H.O.A.	H.O.A.
K	0.40	LANDSCAPE BUFFER / TRAIL CONNECTION	H.O.A.	H.O.A.
L	0.37	LANDSCAPE BUFFER / TRAIL CONNECTION	H.O.A.	H.O.A.
M	0.26	LANDSCAPE BUFFER / TRAIL CONNECTION	H.O.A.	H.O.A.
N	0.18	LANDSCAPE BUFFER / TRAIL CONNECTION	H.O.A.	H.O.A.
O	0.18	LANDSCAPE BUFFER / TRAIL CONNECTION	H.O.A.	H.O.A.
P	0.24	LANDSCAPE BUFFER / TRAIL CONNECTION	H.O.A.	H.O.A.
Q	0.37	LANDSCAPE BUFFER / TRAIL CONNECTION	H.O.A.	H.O.A.
R	0.40	LANDSCAPE BUFFER / TRAIL CONNECTION	H.O.A.	H.O.A.
S	0.26	LANDSCAPE BUFFER / TRAIL CONNECTION	H.O.A.	H.O.A.
T	0.19	LANDSCAPE BUFFER / TRAIL CONNECTION	H.O.A.	H.O.A.
U	0.21	LANDSCAPE BUFFER	H.O.A.	H.O.A.
V	0.15	LANDSCAPE BUFFER	H.O.A.	H.O.A.
W	0.06	LANDSCAPE BUFFER / TRAIL CONNECTION	H.O.A.	H.O.A.

NOTE: TRACTS ARE SUBJECT TO CHANGE WITH FUTURE PRELIMINARY PLAT APPLICATION.

OWNER:
DAYBREAK RECOVERY ACQUISITION, LLC
JON SHUMAKER
1250 AVENUE OF THE AMERICA'S
50TH FLOOR
NEW YORK, NY 10020

APPLICANT:
RAINTREE INVESTMENT CORP
JERRY RICHMOND
7200 S. ALTON WAY, SUITE C-400
CENTENNIAL, CO 80112
JRICHMOND@RAINTREE.US.COM
303-267-6195

PLANNER:
NORRIS DESIGN
EVA MATHER
1101 BANNOCK STREET
DENVER, CO 80204
EMATHER@NORRIS-DESIGN.COM
303-892-1166

CIVIL ENGINEER/SURVEYOR:
HURST & ASSOCIATES, INC.
JOHN JORGENSON
1265 S. PUBLIC RD., SUITE B
LAFAYETTE, CO 80026
JOHN@HURST.DESIGN
303-449-9105

CHECKED BY: SC
DRAWN BY: SC,DMH

811

NORTH

0 100 200 400
SCALE 1" = 200'

NORRIS DESIGN
Planning | Landscape Architecture | Branding
1101 Bannock Street
Denver, Colorado 80204
P 303.892.1166
www.norris-design.com

COLLIERS HILL
FILING NO. 6 SKETCH PLAN
ERIE, COLORADO

OWNER:
JON SHUMAKER
JERRY B, RICHMOND III
7220 S. ALTON WAY
SUITE C-400
CENTENNIAL, CO 80112

NOT FOR CONSTRUCTION

DATE:
10/30/2020

SHEET TITLE:
SKETCH PLAN

1 OF 1

LSC TRANSPORTATION CONSULTANTS, INC.

1889 York Street
Denver, CO 80206
(303) 333-1105
FAX (303) 333-1107
E-mail: lsc@lscdenver.com

April 12, 2021

Mr. Jerry Richmond
Daybreak Recovery Acquisition, LLC
7200 S. Alton Way, Suite C-400
Centennial, CO 80112

Re: Colliers Hill Filing 6
Traffic Impact Analysis
Erie, CO
LSC #200870

Dear Mr. Richmond:

In response to your request, LSC Transportation Consultants, Inc. has prepared this traffic impact analysis for the proposed Colliers Hill Filing 6. As shown on Figure 1, the site is located north of Weld County Road (WCR) 10 and west of WCR 5 in Erie, Colorado.

REPORT CONTENTS

The report contains the following: the existing roadway and traffic conditions in the vicinity of the site including the lane geometries, traffic controls, posted speed limits, etc.; the existing weekday peak-hour traffic volumes; the existing daily traffic volumes in the area; the typical weekday site-generated traffic volume projections for the site; the assignment of the projected traffic volumes to the area roadways; an estimate of 2026 and 2041 background traffic, and any recommended roadway improvements to mitigate the site's traffic impacts.

LAND USE AND ACCESS

The site is proposed to include 487 residential dwelling units including 343 single-family detached homes and 144 single-family attached homes. Access is proposed to WCR 10 aligning with the existing Horizon Avenue and Eva Peak Drive intersections and to WCR 10 about 1,085 feet north of WCR 10. The conceptual site plan is shown in Figure 2.

ROADWAY AND TRAFFIC CONDITIONS

Area Roadways

The major roadways in the site's vicinity are shown on Figure 1 and are described below.

- **Erie Parkway** is an east-west, two-lane arterial roadway south of the site. The intersections with Colliers Boulevard (WCR 3) and WCR 5 are signalized and have existing auxi-

liary turn lanes. The posted speed limit in the vicinity of the site varies between 40 and 50 mph. The *Town of Erie Transportation Plan* shows a four-lane principal arterial by 2040.

- **Weld County Road 5** is a north-south, two-lane minor arterial roadway east of the site. The intersections with Erie Parkway and Colliers Parkway are signalized. The posted speed limit in the vicinity of the site is 45 mph. The *Town of Erie Transportation Plan* shows a four-lane minor arterial south of WCR 10 by 2040.

- **Weld County Road 10** is an east-west, two-lane minor arterial roadway south of the site. The intersections with WCR 3 and WCR 5 are stop-sign controlled.

- **Colliers Parkway** is an east-west, two-lane collector roadway connecting Colliers Boulevard (WCR 3) and WCR 5.

Existing Traffic Conditions

Figure 3 shows the existing lane geometries, traffic controls, posted speed limits, and traffic volumes in the site's vicinity on a typical weekday. The weekday peak-hour traffic volumes and daily traffic counts are from the attached traffic counts conducted by Counter Measures in December, 2020. Note that both Erie High School and Soaring Heights PK-8 School were not in session at the time the counts were conducted.

2026 and 2041 Background Traffic

Figure 4 show the estimated 2026 background traffic, lane geometries and traffic controls. The 2026 background traffic includes the existing traffic volume (from Figure 3) plus increases in through traffic of about one percent per year, due to regional growth and traffic estimated to be generated by buildout of existing and currently proposed subdivisions in the vicinity of the site including Colliers Hill Villages 2 through 13, the residential portion of Erie Highlands, Sunset, Westerly, and Morgan Hill. The 2026 background traffic volumes also includes estimates of additional traffic due to Erie High School, Soaring Heights PK-8, and the elementary school currently under construction in the Erie Highlands development.

Figure 5 shows the 2041 background traffic, lane geometries and traffic controls. The volumes shown in Figure 5 were developed based on the projected 2026 background traffic volumes shown in Figure 4 plus increases in through traffic of about one percent per year, due to regional growth and traffic projected to be generated by Colliers Hill Villages 14 and 15, and the non-residential portion of the Erie Highlands development. The traffic volumes shown in Figure 5 plus site-generated traffic are similar to or greater than the 2040 traffic projections in the *Erie Transportation Plan*.

Existing, 2026, and 2041 Background Levels of Service

Level of service (LOS) is a quantitative measure of the level of congestion or delay at an intersection. Level of service is indicated on a scale from "A" to "F." LOS A is indicative of little congestion or delay and LOS F is indicative of a high level of congestion or delay. Attached are specific level of service definitions for signalized and unsignalized intersections.

The intersections in Figures 3, 4, and 5 were analyzed as appropriate to determine the existing, 2026, and 2041 background levels of service using Synchro. Table 1 shows the level of service analysis results. The level of service reports are attached.

- **WCR 10/Colliers Boulevard (WCR 3):** All movements at this unsignalized intersection currently operate at LOS "B" or better during the morning and afternoon peak-hours. By 2026, all movements are expected to operate at LOS "C" or better during both peak-hours and are expected to do so through 2041.

- **WCR 10/Horizon Avenue:** All movements at this unsignalized intersection are expected to operate at LOS "B" or better during both peak-hours through 2041.

- **WCR 10/Eva Peak Drive:** All movements at this unsignalized intersection are expected to operate at LOS "A" during both peak-hours through 2041.

- **WCR 5/WCR 10:** All movements at this unsignalized intersection currently operate at LOS "B" or better and are expected to operate at LOS "C" or better through 2041.

- **WCR 5/Colliers Parkway/High School Access:** This signalized intersection currently operates at an overall LOS "A" primarily because the school was closed at the time the traffic counts were conducted. By 2026 it is expected to operate at an overall LOS "C" or better during both peak-hours and do so through 2041.

- **WCR 5/Erie Parkway:** This signalized intersection currently operates at an overall LOS "B" during both morning and afternoon peak-hours. By 2026, the intersection is expected to operate at LOS "D" or better during both peak-hours with no improvements. By 2041 it was assumed this intersection would be improved to provide two through lanes in each direction and dual left-turn lanes on three of the approaches. Based on these improvements the intersection is projected to operate at LOS "C" during both peak-hours through 2041.

- **WCR 5/Flora View Drive/Soaring Heights PK-8 School Access:** The westbound left-turn movement at this unsignalized intersection is projected to operate at LOS "F" during the morning peak-hour based on the projected 2026 background traffic volumes. By 2041 both the eastbound and westbound left-turn movements are projected to operate at LOS "F" during the morning peak-hour if this intersection remains stop-sign controlled. The developer has agreed to signalize this intersection if/when warrants are met.

TRIP GENERATION

Table 2 shows the estimated average weekday, morning peak-hour, and afternoon peak-hour trip generation for the proposed site based on the rates from *Trip Generation, 10th Edition, 2017* by the Institute of Transportation Engineers (ITE) for the proposed land use.

The proposed land use is projected to generate about 4,597 vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. During the morning peak-hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 90 vehicles would enter and about 270 vehicles would exit the site. During the afternoon peak-hour, which

generally occurs for one hour between 4:00 and 6:00 p.m., about 304 vehicles would enter and about 178 vehicles would exit.

TRIP DISTRIBUTION

Figure 6 shows the estimated directional distribution of the site-generated traffic volumes on the area roadways. The estimates were based on the location of the site with respect to the regional population, employment, and activity centers; and the site's proposed land use.

TRIP ASSIGNMENT

Figures 7a and 7b show the estimated site-generated traffic volumes which are the directional distribution percentages (from Figure 6) applied to the trip generation estimate (from Table 2).

2026 AND 2041 TOTAL TRAFFIC

Figure 8 shows the 2026 total traffic which is the sum of the 2026 background traffic volumes (from Figure 4) and the site-generated traffic volumes (from Figure 7a). Table 3 and Figure 8 show the recommended 2026 lane geometry and traffic control.

Figure 9 shows the 2041 total traffic which is the sum of the 2041 background traffic volumes (from Figure 5) and the site-generated traffic volumes (from Figure 7a). Table 3 and Figure 9 show the recommended 2041 lane geometry and traffic control.

PROJECTED LEVELS OF SERVICE

The intersections in Figures 8 and 9 were analyzed to determine the 2026 and 2041 total levels of service. Table 1 shows the level of service analysis results. The level of service reports are attached.

- **WCR 10/Colliers Boulevard (WCR 3):** All movements at this unsignalized intersection are expected to operate at LOS "C" or better during both peak-hours through 2041.

- **WCR 10/Horizon Avenue:** All movements at this unsignalized intersection are expected to operate at LOS "B" or better during both peak-hours through 2041.

- **WCR 10/Eva Peak Drive:** All movements at this unsignalized intersection are expected to operate at LOS "B" or better during both peak-hours and are expected to do so through 2041.

- **WCR 5/WCR 10:** All movements at this unsignalized intersection are expected to operate at LOS "D" or better through 2026. By 2041 the westbound left-turn movement is projected to operate at LOS "E" during both peak-hours. If this intersection were to be converted to traffic signal control it is projected to operate at LOS "A" during both peak-hours through 2041.

- **WCR 5/Colliers Hill Filing 6 Access:** All movements at the proposed site access to WCR 5 are projected to operate at LOS "B" or better during both peak-hours through 2041 with stop-sign control.

- **WCR 5/Colliers Parkway/High School Access:** This signalized intersection is expected to operate at an overall LOS "C" or better during both peak-hours through 2041.

- **WCR 5/Erie Parkway:** This signalized intersection is expected to operate at LOS "D" or better during both peak-hours through 2026 with no improvements. By 2041 it was assumed this intersection would be improved to provide two through lanes in each direction and dual left-turn lanes on three of the approaches. Based on these improvements the intersection is projected to operate at LOS "C" during both peak-hours through 2041.

- **WCR 5/Flora View Drive/Soaring Heights PK-8 School Access:** The westbound left-turn, eastbound left-turn and through movements at this unsignalized intersection are projected to operate at LOS "F" during the morning peak-hour based on the projected 2026 total traffic volumes. By 2041 both the eastbound and westbound left-turn movements are projected to operate at LOS "F" during the morning and afternoon peak-hours if this intersection remains stop-sign controlled. If this intersection were to be converted to traffic signal control it is projected to operate at LOS "C" or better during both peak-hours through 2041. The developer has agreed to signalize this intersection if/when warrants are met.

TRAFFIC SIGNAL WARRANTS

WCR 5/WCR 10

Table 4 shows the results of a signal warrant analysis for the intersection of WCR 5/WCR 10 based the Eight-Hour, Four-Hour, and Peak-Hour Vehicular Volume warrants and on the projected 2026 and 2041 peak-hour traffic volumes. Based on the results of the analysis, it is unlikely that a vehicular volume traffic signal warrant(s) would be met based on the 2026 total traffic volumes but one or more warrants may be met based on the 2041 total traffic volumes.

WCR 5/Flora View Drive/Soaring Heights PK-8 School Access

Table 5 shows the results of the vehicular volume traffic signal warrant analysis for the intersection of WCR 5/Flora View Drive/Soaring Heights PK-8 School based on the projected 2026 and 2041 peak-hour traffic volumes. Based on the results of the analysis it is unlikely that a vehicular volume traffic signal warrant(s) would be met based on the 2026 total traffic volumes but one or more warrants may be met based on the 2041 total traffic volumes.

This intersection could also potentially meet the criteria for Warrant 5, School Crossing, in the future once the west leg (Flora View Drive) is constructed and a significant number of homes in the Colliers Hill development are occupied.

CONCLUSIONS AND RECOMMENDATIONS

Trip Generation

1. The site is projected to generate about 4,597 vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. During the morning peak-hour, about 90 vehicles would enter and about 270 vehicles would exit the site. During the afternoon peak-hour, about 304 vehicles would enter and about 178 vehicles would exit.

Projected Levels of Service

2. The proposed access points to WCR 5 and WCR 10 and the intersection of WCR 10/ Colliers Boulevard are expected to operate at LOS "D" or better for all movements during the morning and afternoon peak-hours through 2041 as stop-sign controlled intersections.

3. The existing signalized intersections WCR 5/Erie Parkway and WCR 5/Colliers Parkway/ Erie High School are expected to operate at an overall LOS "D" or better during both morning and afternoon peak-hours through 2041.

4. All movements at the stop-sign controlled intersection of WCR 5/WCR 10 currently operate at LOS "D" or better and are expected to do so through 2026. By 2041 the westbound left-turn movement is projected to operate at LOS "E" during both peak-hours. If this intersection were to be converted to signal control it is projected to operate at LOS "A" during both peak-hours through 2041.

5. The westbound left-turn movement at the stop-sign controlled Soaring Heights PK-8 School access to WCR 5 is projected to operate at LOS "F" during the morning peak-hour based on the projected existing traffic volumes. By 2041 both the eastbound and westbound left-turn movements are projected to operate at LOS "F" during the morning and afternoon peak-hours if this intersection remains stop-sign controlled. If this intersection were to be converted to signal control it is projected to operate at LOS "C" or better during both peak-hours through 2041. The developer has agreed to signalize this intersection if/when warrants are met.

Conclusions

6. The impact of the Colliers Hill Filing 6 can be accommodated by the existing and proposed roadway network with the recommended improvements shown in Table 3 and Figures 8 and 9.

* * * * *

We trust our findings will assist you in gaining approval of the proposed Colliers Hill Filing 6 development. Please contact me if you have any questions or need further assistance.

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.

By _____
Christopher S. McGranahan, PE, PTOE
Principal

CSM/wc

4-12-21

Enclosures: Tables 1 - 5
Figures 1 - 9
Traffic Count Reports
Level of Service Definitions
Level of Service Reports

W:\LSC\Projects\2020\200870-ColliersHillFiling6\Report\ColliersHillFiling6-041221.wpd

Table 1 (Page 1 of 3)
Intersection Levels of Service Analysis
Colliers Hill - Filing 6
Erie, CO
LSC #200870; April, 2021

Intersection Location	Traffic Control	Existing Traffic Level of Service AM	Existing Traffic Level of Service PM	2026 Background Traffic Level of Service AM	2026 Background Traffic Level of Service PM	2026 Total Traffic Level of Service AM	2026 Total Traffic Level of Service PM	2041 Background Traffic Level of Service AM	2041 Background Traffic Level of Service PM	2041 Total Traffic Level of Service AM	2041 Total Traffic Level of Service PM
WCR 10/Colliers Boulevard (WCR 3)	TWSC										
WB Left		A	B	B	C	B	C	B	C	B	C
WB Right		A	A	B	B	B	B	B	B	B	B
SB Left		A	A	A	A	A	A	A	A	A	A
Critical Movement Delay		9.6	10.8	13.2	16.4	13.7	18.8	14.0	20.0	14.5	23.4
WCR 10/Horizon Avenue	TWSC										
NB Left		--	--	B	B	B	B	B	B	B	B
NB Right or Through/Right		--	--	A	A	B	B	A	A	B	B
EB Left		--	--	--	--	A	A	--	--	A	A
WB Left		--	--	A	A	A	A	A	A	A	A
SB Left		--	--	--	--	B	B	--	--	B	B
SB Through/Right		--	--	--	--	B	B	--	--	B	B
Critical Movement Delay		--	--	10.0	10.1	11.4	12.4	10.0	10.2	11.4	12.5
WCR 10/Eva Peak Drive	TWSC										
NB Approach		--	--	A	A	A	B	A	A	A	B
EB Left		--	--	--	--	A	A	--	--	A	A
WB Left		--	--	A	A	A	A	A	A	A	A
SB Approach		--	--	--	--	B	B	--	--	B	B
Critical Movement Delay		--	--	9.3	9.4	12.0	13.0	9.1	9.4	11.6	12.3
WCR 10/WCR 5	TWSC										
NB Left		A	A	A	A	A	A	A	A	A	A
EB Left		B	B	C	C	D	D	C	C	D	D
EB Through/Right		A	A	B	B	C	C	B	B	B	C
WB Approach		B	B	C	C	D	D	--	--	--	--
WB Left		--	--	--	--	--	--	C	C	E	E
WB Through/Right		--	--	--	--	--	--	C	B	C	C
SB Left or Left/Through		A	A	A	A	A	A	A	A	A	A
Critical Movement Delay		11.3	11.4	22.4	16.7	34.9	30.5	22.7	21.7	38.0	46.7
	Signalized										
EB Left		--	--	--	--	--	--	--	--	D	D
EB Through/Right		--	--	--	--	--	--	--	--	C	C
WB Left		--	--	--	--	--	--	--	--	D	E
WB Through/Right		--	--	--	--	--	--	--	--	D	D
NB Left		--	--	--	--	--	--	--	--	A	A
NB Through/Right		--	--	--	--	--	--	--	--	A	A
SB Left		--	--	--	--	--	--	--	--	A	A
SB Through		--	--	--	--	--	--	--	--	A	A
SB Right		--	--	--	--	--	--	--	--	A	A
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--	--	--	8.0	9.5
Entire Intersection LOS		--	--	--	--	--	--	--	--	A	A

Table 1 (Page 2 of 3)
Intersection Levels of Service Analysis
Colliers Hill - Filing 6
Erie, CO
LSC #200870; April, 2021

Intersection Location	Traffic Control	Existing Traffic Level of Service AM	Existing Traffic Level of Service PM	2026 Background Traffic Level of Service AM	2026 Background Traffic Level of Service PM	2026 Total Traffic Level of Service AM	2026 Total Traffic Level of Service PM	2041 Background Traffic Level of Service AM	2041 Background Traffic Level of Service PM	2041 Total Traffic Level of Service AM	2041 Total Traffic Level of Service PM
WCR 5/Filing 6 Access	TWSC										
NB Left		--	--	--	--	A	A	--	--	A	A
EB Approach		--	--	--	--	B	B	--	--	B	B
Critical Movement Delay		--	--	--	--	12.0	11.9	--	--	12.5	12.7
WCR 5/Colliers Parkway/Erie High School	Signalized										
EB Left		C	C	C	C	C	C	C	C	C	C
EB Through		C	C	D	C	D	C	D	C	D	C
EB Right		A	A	A	B	A	B	A	B	B	B
WB Left		C	C	D	C	D	C	D	C	D	C
WB Through/Right		C	C	C	C	C	C	C	C	C	C
NB Left		A	A	B	A	B	A	B	A	B	B
NB Through		A	A	B	A	B	A	B	A	B	A
NB Right		A	A	A	A	A	A	A	A	A	A
SB Left		A	A	B	A	B	A	B	A	B	A
SB Through/Right		A	A	--	--	--	--	--	--	--	--
SB Through		--	--	B	A	B	B	B	B	B	B
SB Right		--	--	A	A	A	A	A	A	A	A
Entire Intersection Delay (sec /veh)		6.6	5.1	21.8	10.5	21.8	10.4	23.0	11.0	23.4	11.0
Entire Intersection LOS		A	A	C	B	C	B	C	B	C	B
WCR 5/Erie Parkway	Signalized										
EB Left		A	A	E	C	E	D	D	D	D	D
EB Through		A	B	C	D	C	D	B	B	C	C
EB Right		A	A	A	A	A	B	A	A	A	A
WB Left		A	A	B	C	B	C	B	B	B	B
WB Through		A	B	D	C	E	D	C	C	C	C
WB Right		A	A	A	A	A	A	A	A	A	A
NB Left		C	C	D	D	D	D	D	D	D	D
NB Through/Right		D	D	E	D	E	D	--	--	--	--
NB Through		--	--	--	--	--	--	D	D	D	D
NB Right		--	--	--	--	--	--	A	A	A	A
SB Left		C	D	E	D	E	D	D	D	D	D
SB Through		D	D	D	D	D	D	D	D	D	D
SB Right		A	A	A	A	A	A	C	B	C	B
Entire Intersection Delay (sec /veh)		15.8	19.0	39.8	32.4	43.5	37.1	29.2	25.1	31.2	26.5
Entire Intersection LOS		B	B	D	C	D	D	C	C	C	C

Table 1 (Page 3 of 3)
Intersection Levels of Service Analysis
Colliers Hill - Filing 6
Erie, CO
LSC #200870; April, 2021

		Existing Traffic		2026 Background Traffic		2026 Total Traffic		2041 Background Traffic		2041 Total Traffic	
Intersection Location	Traffic Control	Level of Service AM	Level of Service PM	Level of Service AM	Level of Service PM	Level of Service AM	Level of Service PM	Level of Service AM	Level of Service PM	Level of Service AM	Level of Service PM
WCR 10/Soaring Heights PK-8/Flora View Drive	TWSC										
NB Left		--	--	A	A	A	A	A	A	A	A
EB Left		--	--	E	C	F	D	F	D	F	F
EB Through		--	--	E	C	F	D	E	D	F	E
EB Right		--	--	B	B	B	B	B	B	B	B
WB Left		--	--	F	C	F	E	F	F	F	F
WB Through/Right		--	--	B	A	B	B	B	B	B	B
SB Left		--	--	A	A	B	A	B	A	B	A
Critical Movement Delay		--	--	>240	24.6	>240	46.0	>240	51.0	>240	141.1
	Signalized										
EB Left		--	--	--	--	C	D	--	--	C	D
EB Through		--	--	--	--	D	D	--	--	D	D
EB Right		--	--	--	--	A	A	--	--	B	B
WB Left		--	--	--	--	D	D	--	--	D	D
WB Through/Right		--	--	--	--	A	C	--	--	A	C
NB Left		--	--	--	--	B	A	--	--	B	A
NB Through		--	--	--	--	C	A	--	--	C	A
NB Right		--	--	--	--	A	A	--	--	A	A
SB Left		--	--	--	--	B	A	--	--	B	A
SB Through		--	--	--	--	B	A	--	--	B	A
SB Right		--	--	--	--	A	A	--	--	A	A
Entire Intersection Delay (sec /veh)		--	--	--	--	21.3	9.7	--	--	21.3	10.3
Entire Intersection LOS		--	--	--	--	C	A	--	--	C	B

Table 2
Trip Generation Estimate
Colliers Hill Filing No. 6
Erie, CO
LSC #200870; April, 2021

		Trip Generation Rates [1]					Total Trips Generated				
	Trip Generation	Average Weekday	Morning Peak-Hour		Afternoon Peak-Hour		Average Weekday	Morning Peak-Hour		Afternoon Peak-Hour	
Land Use Description	Units	Traffic	In	Out	In	Out	Traffic	In	Out	In	Out
Single Family Residential[2]	487 DU[3]	9.44	0.1850	0.5550	0.6237	0.3663	4,597	90	270	304	178

Notes:
(1) Source: *Trip Generation, Institute of Transportation Engineers* , 10th Edition, 2017.
(2) ITE Land Use No. 210 - Single Family Detached Housing
(3) DU = Dwelling Unit

Table 3
Recommended Improvements to Public Street Network
Colliers Hill Filing 6
Erie, CO
LSC #200870; April, 2021

Intersection Location	Recommended Improvements by 2026 (1)	Responsibility (1)	Recommended Improvements by 2041 (1)	Responsibility (1) (2)
WCR 10/Colliers Boulevard (WCR 3)	None		None	
WCR 10/Horizon Avenue	EB LT - construct lane - 1 @ 125 feet and 12:1 transition taper	Applicant	None	
	SB LT - construct lane - 1 @ 100 feet and 10:1 transition taper	Applicant		
WCR 10/Eva Peak Drive	EB LT - construct lane - 1 @ 125 feet and 12:1 transition taper	Applicant	None	
WCR 10/WCR 5	None		SB LT - construct lane - 125 feet and 12:1 transition taper	Others
			WB LT - construct lane - 125 feet and 12:1 transition taper	Others
			Pave east leg	Others
			Potential Traffic Signal Control	Applicant/Others
WCR 5/Colliers Hill Filing 6 Access	NB LT - construct lane - 1 @ 200 feet and 12:1 transition taper	Applicant	None	
	SB RT - construct lane - 1 @ 100 feet and 12:1 transition taper	Applicant		
WCR 5/Colliers Parkway/Erie High School	Add second NB lane	Applicant/Town	None	
	Add second SB lane	Applicant/Town		
	SB RT - construct lane - 1 @ 250 feet and 12:1 transition taper	Applicant/Town		
WCR 5/Erie Parkway	None		SB LT - construct lane - 2 @ 300 feet and 12:1 transition taper	Others
			Add second SB lane	Others
			NB LT - construct lane - 2 @ 200 feet and 12:1 transition taper	Others
			Add second NB lane	Others
			EB LT - construct lane - 2 @ 250 feet and 12:1 transition taper	Others
			Add second EB lane	Others
			Add second WB lane	Others
WCR 10/Soaring Heights School/Flora View Drive	EB LT - construct lane - 1 @ 100 feet and 10:1 transition taper	Applicant/Town	None	
	Construct EB through lane	Applicant/Town		
	EB RT - construct lane - 1 @ 150 feet and 10:1 transition taper	Applicant/Town		
	NB LT - construct lane - 1 @ 250 feet and 12:1 transition taper	Applicant/Town		
	SB LT - construct lane - 1 @ 250 feet and 12:1 transition taper	Applicant/Town		
	SB RT - construct lane - 1 @ 150 feet and 12:1 transition taper	Applicant/Town		
	Traffic Signal Control	Applicant/Town		

Notes:
(1) The 2026 recommended improvements are also shown in Figure 8 and the 2041 recommended improvements are also shown in Figure 9. Improvements are based on Town of Erie standards.
(2) Others would likely be a mix of other developers and the Town.

Table 4
WCR 5/WCR 10
Colliers Hill Filing 6
Erie, CO
LSC #200870; April, 2021

				Warrant Analysis[1]													
				Warrant 1: Eight Hour Vehicular Volume Evaluation									Warrant 2: Four Hour Vehicular Volume Evaluation			Warrant 3: Peak Hour Vehicular Volume Evaluation		
				Warrant Thresholds				Warrant Threshold Met?						Warrant Threshold Met?			Warrant Threshold Met?	
				Condition A (70%)		Condition B (70%)		Minor 1 Leg		Minor 2 Leg								
Hour	Major[2]	Minor 1[3]	Minor 2[3]	Major	Minor	Major	Minor	A	B	A	B	56% Combined Condition Warrant Threshold Met?	70% Warrant Threshold Minor Minimum	Minor 1 Leg	Minor 2 Leg	70% Warrant Threshold Minor Minimum	Minor 1 Leg	Minor 2 Leg
2026 Background Traffic																		
AM Peak	612	30	86	420	140	630	70	No	No	No	No	No	175	No	No	315	No	No
PM Peak	507	91	104	420	140	630	70	No	No	No	No	No	230	No	No	370	No	No
2026 Total Traffic																		
AM Peak	758	33	131	420	140	630	70	No	No	No	Yes	Yes	140	No	No	265	No	No
PM Peak	754	43	135	420	140	630	70	No	No	No	Yes	Yes	140	No	No	265	No	No
2041 Background Traffic																		
AM Peak	682	36	72	420	140	630	70	No	No	No	Yes	No	175	No	No	315	No	No
PM Peak	595	41	103	420	140	630	70	No	No	No	No	No	230	No	No	370	No	No
2041 Total Traffic																		
AM Peak	829	40	117	420	140	630	70	No	No	No	Yes	Yes	110	No	Yes	220	No	No
PM Peak	843	53	134	420	140	630	70	No	No	No	Yes	Yes	110	No	Yes	220	No	No

Notes:
(1) Thresholds are based on 2 or more lanes on the major approach and 2 or more lanes on the minor approach with the 70% factor applied for a posted speed limit above 40 mph
(2) The major street traffic includes all movements (left, through, and right)
(3) The minor street traffic includes left, through, and half of right-turn volumes from the minor street

Source: LSC Transportation Consultants, Inc.

Table 5
WCR 5/Flora View Drive/Soaring Heights PK-8 School
Colliers Hill Filing 6
Erie, CO
LSC #200870; April, 2021

				Warrant Analysis[1]													
				Warrant 1: Eight Hour Vehicular Volume Evaluation									Warrant 2: Four Hour Vehicular Volume Evaluation			Warrant 3: Peak Hour Vehicular Volume Evaluation		
				Warrant Thresholds				Warrant Threshold Met?				56% Combined Condition Warrant Threshold Met?	70% Warrant Threshold Minor Minimum	Warrant Threshold Met?		70% Warrant Threshold Minor Minimum	Warrant Threshold Met?	
				Condition A (70%)		Condition B (70%)		Minor 1 Leg		Minor 2 Leg								
Hour	Major[2]	Minor 1[3]	Minor 2[3]	Major	Minor	Major	Minor	A	B	A	B			Minor 1 Leg	Minor 2 Leg		Minor 1 Leg	Minor 2 Leg
2026 Background Traffic																		
AM Peak	847	53	243	420	140	630	70	N/A	N/A	Yes	Yes	Yes	110	No	Yes	220	N/A	Yes
PM Peak	706	36	66	420	140	630	70	N/A	N/A	No	No	No	140	No	No	265	N/A	No
2026 Total Traffic																		
AM Peak	1055	53	245	420	140	630	70	N/A	N/A	Yes	Yes	Yes	80	No	Yes	145	N/A	Yes
PM Peak	991	36	68	420	140	630	70	N/A	N/A	No	No	No	80	No	No	180	N/A	No
2040 Background Traffic																		
AM Peak	903	115	249	420	140	630	70	No	Yes	Yes	Yes	Yes	80	Yes	Yes	180	No	Yes
PM Peak	863	67	70	420	140	630	70	No	No	No	No	No	110	No	No	220	No	No
2040 Total Traffic																		
AM Peak	1111	115	251	420	140	630	70	No	Yes	Yes	Yes	Yes	80	Yes	Yes	120	No	Yes
PM Peak	1149	67	72	420	140	630	70	No	No	No	Yes	No	80	No	No	120	No	No

Notes:
(1) Thresholds are based on 2 or more lanes on the major approach and 2 or more lanes on the minor approach with the 70% factor applied for a posted speed limit above 40 mph
(2) The major street traffic includes all movements (left, through, and right)
(3) The minor street traffic includes left, through, and half of right-turn volumes from the minor street

Source: LSC Transportation Consultants, Inc.

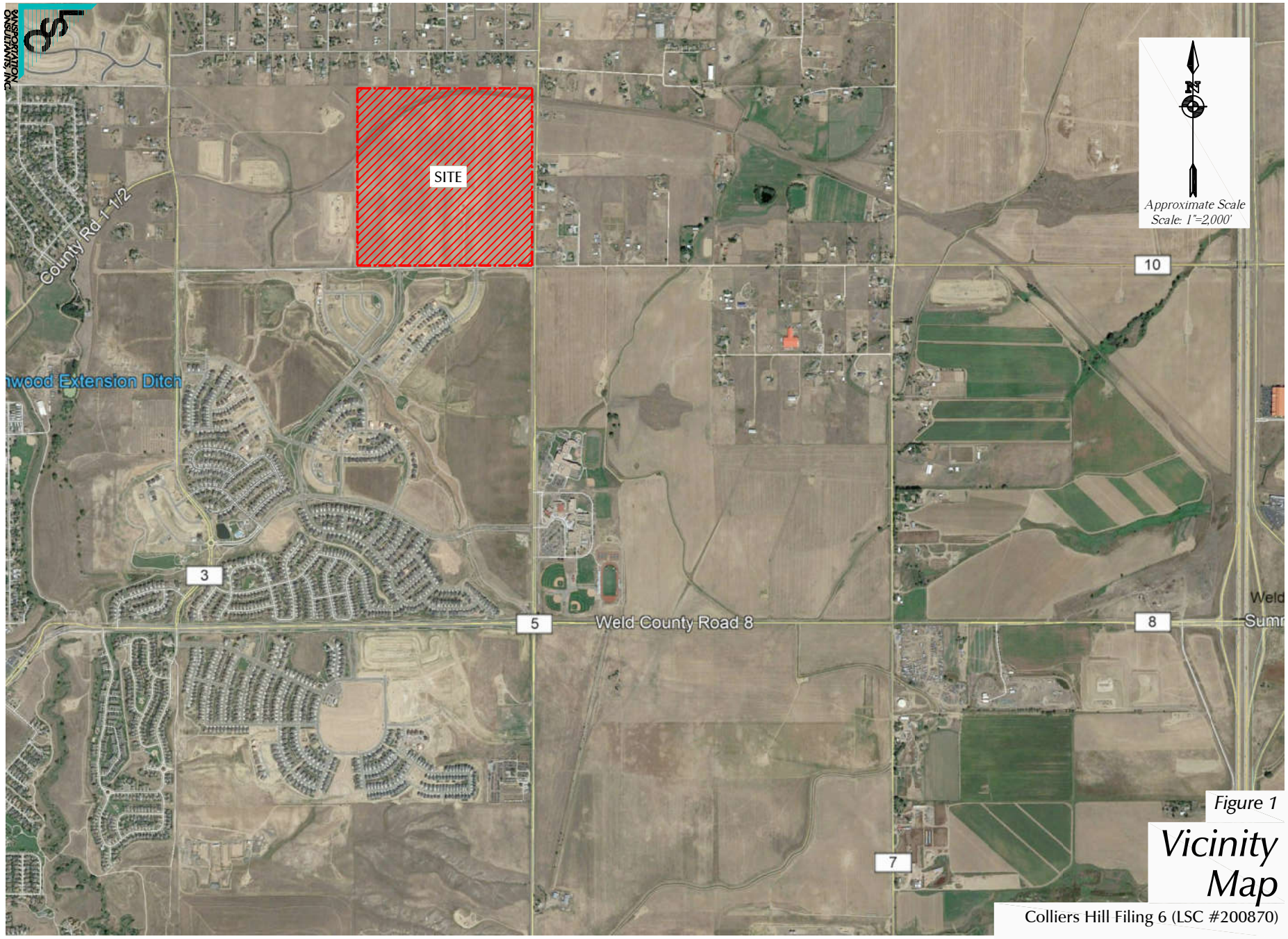


Figure 1

Vicinity Map

Colliers Hill Filing 6 (LSC #200870)

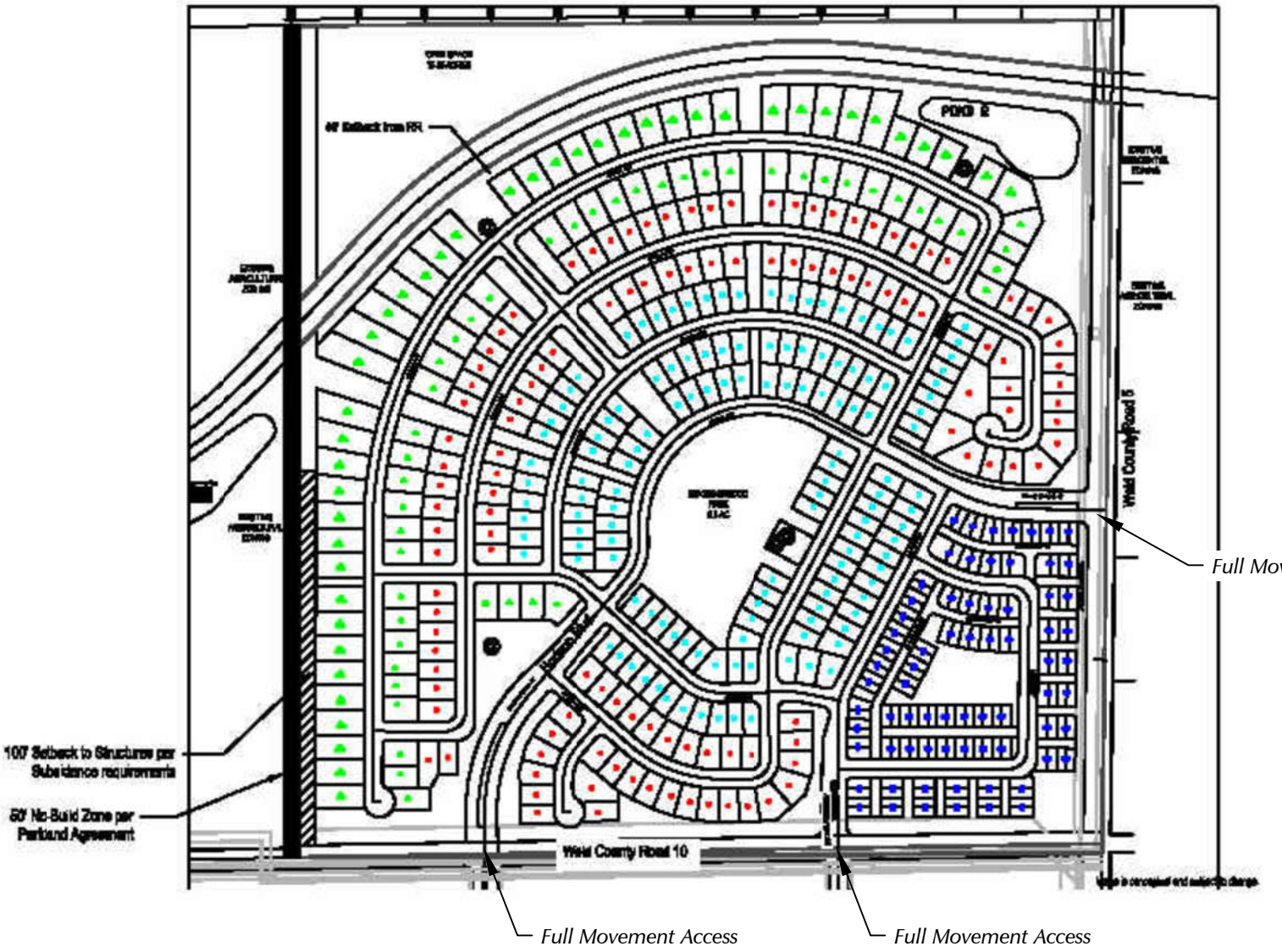
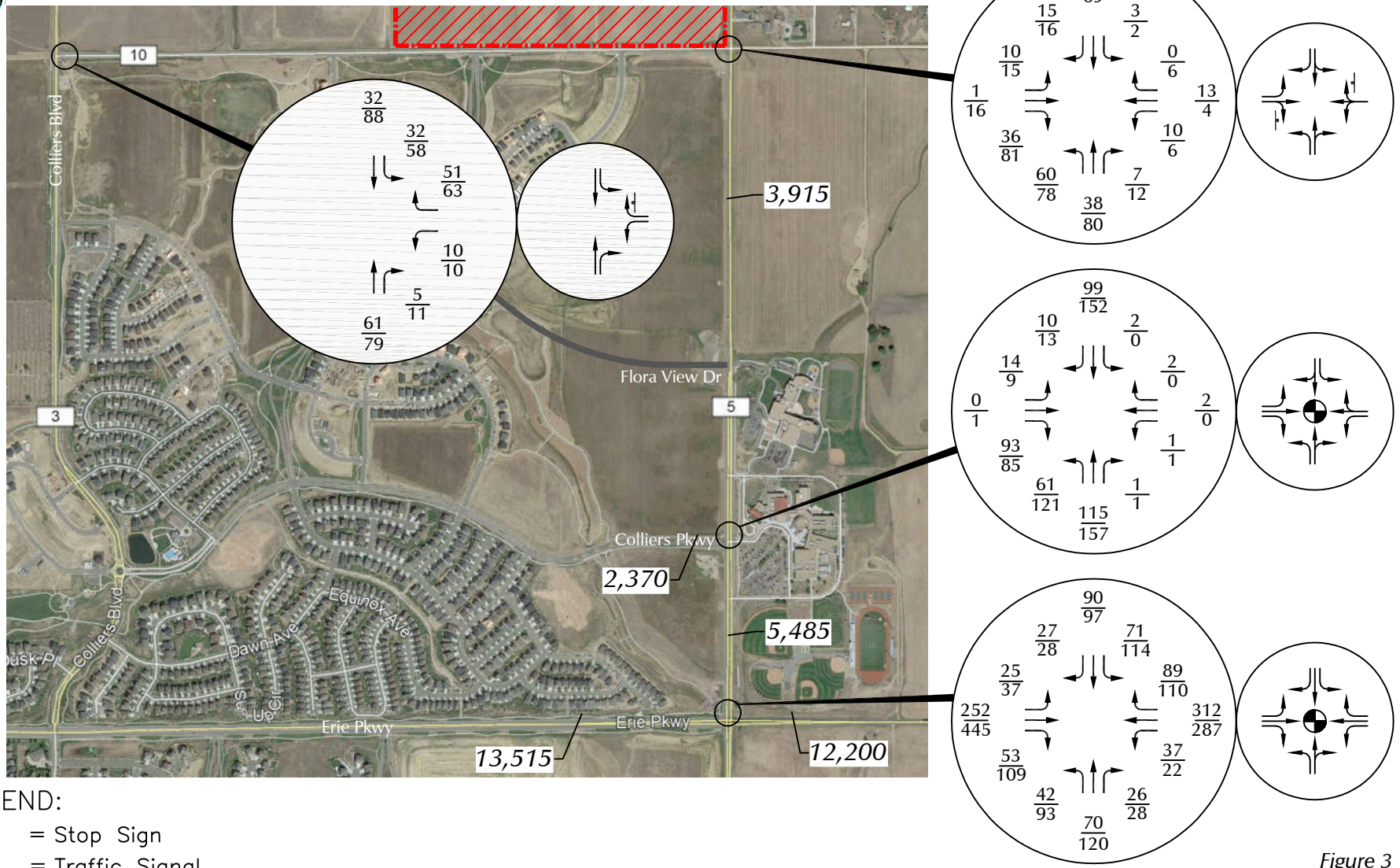


Figure 2

Site Plan

Colliers Hill Filing 6 (LSC #200870)



LEGEND:

= Stop Sign

= Traffic Signal

= Speed Limit

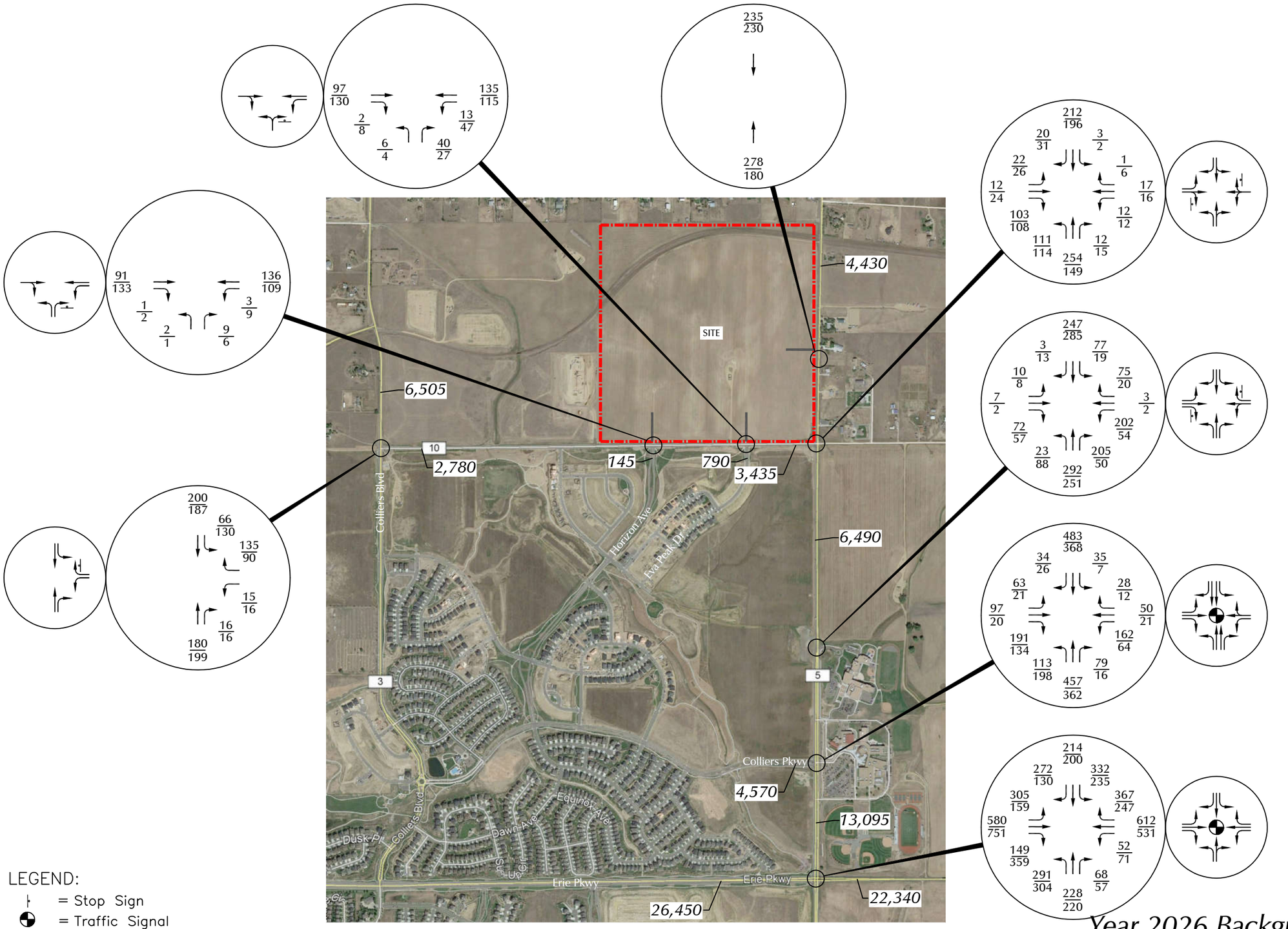
$\frac{26}{35}$ = $\frac{\text{AM Peak Hour Traffic}}{\text{PM Peak Hour Traffic}}$

1,000 = Average Daily Traffic

Figure 3

December, 2020 Existing Traffic, Lane Geometry and Traffic Control

Colliers Hill Filing 6 (LSC #200870)



Approximate Scale
Scale: 1"= 1,200'

LEGEND:

= Stop Sign

= Traffic Signal

$\frac{26}{35}$ = $\frac{\text{AM Peak Hour Traffic}}{\text{PM Peak Hour Traffic}}$

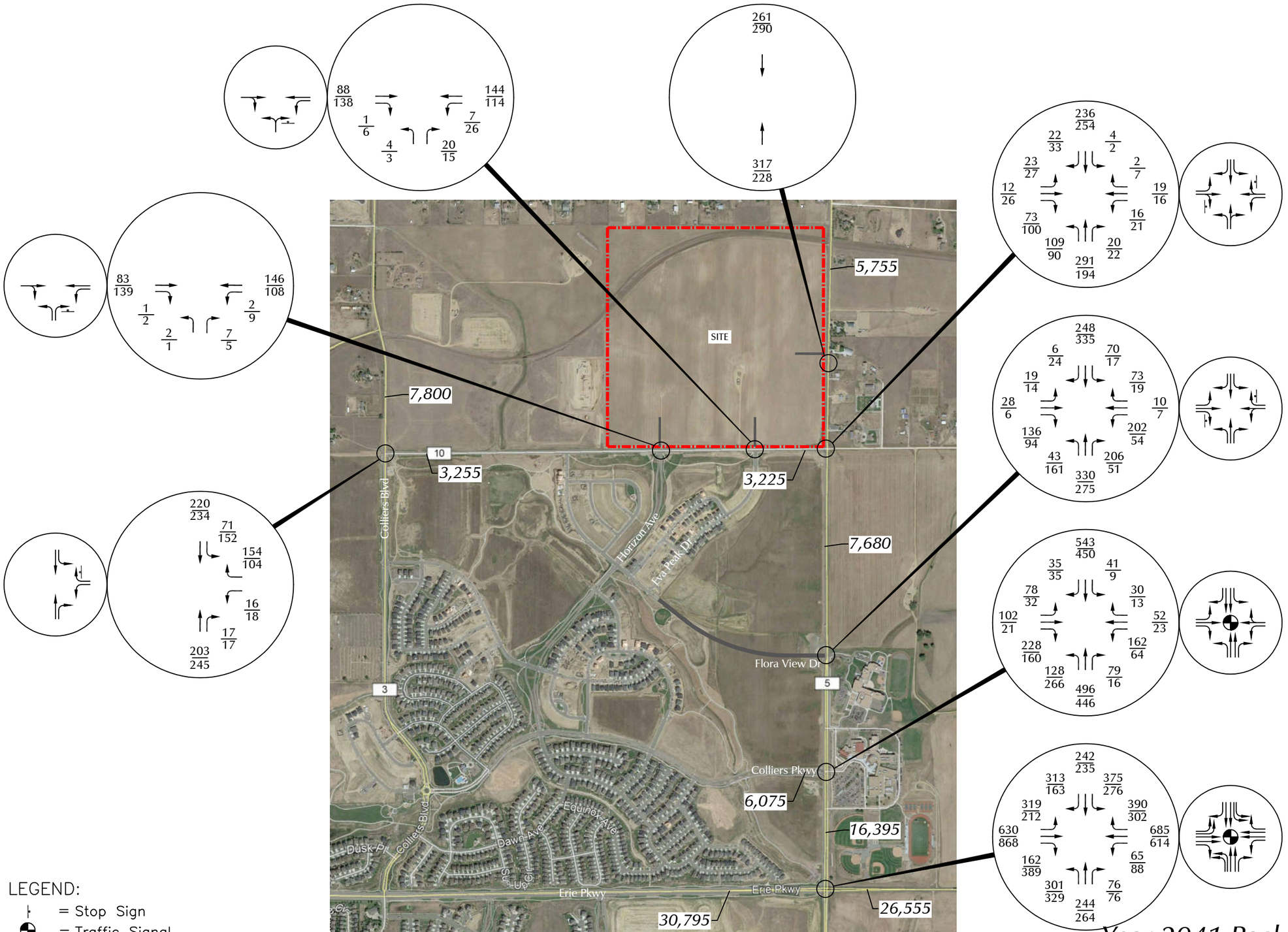
1,000 = Average Daily Traffic

TRANSPORTATION CONSULTANTS, INC.

Figure 4

Year 2026 Background Traffic, Lane Geometry and Traffic Control

Colliers Hill Filing 6 (LSC #200870)



LEGEND:

= Stop Sign

= Traffic Signal

$\frac{26}{35}$ = $\frac{\text{AM Peak Hour Traffic}}{\text{PM Peak Hour Traffic}}$

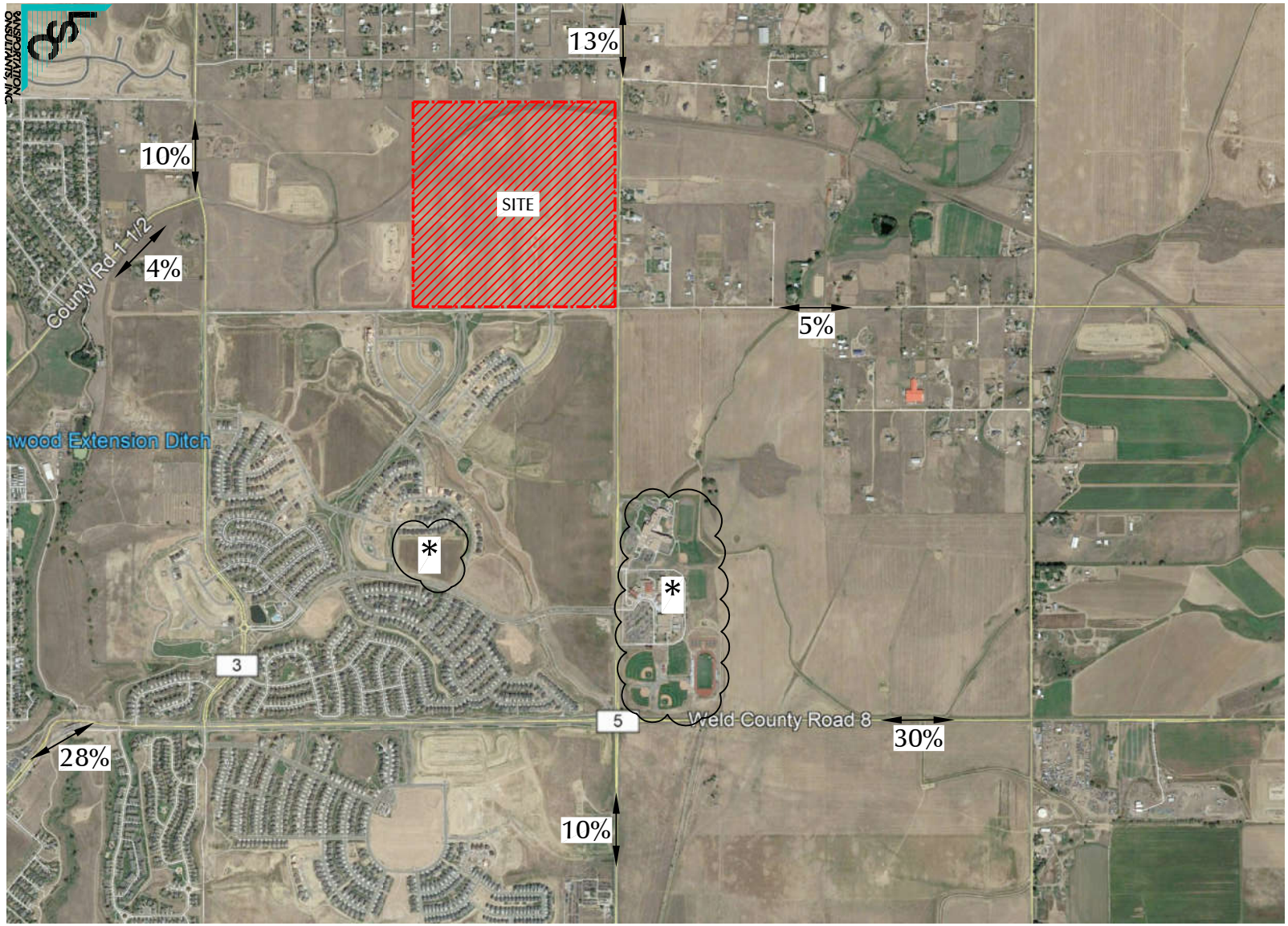
1,000 = Average Daily Traffic

LSC TRANSPORTATION CONSULTANTS, INC.

Figure 5

Year 2041 Background Traffic, Lane Geometry and Traffic Control

Colliers Hill Filing 6 (LSC #200870)



* See Appendix Table 2 for assumption of internal trip within the study area.

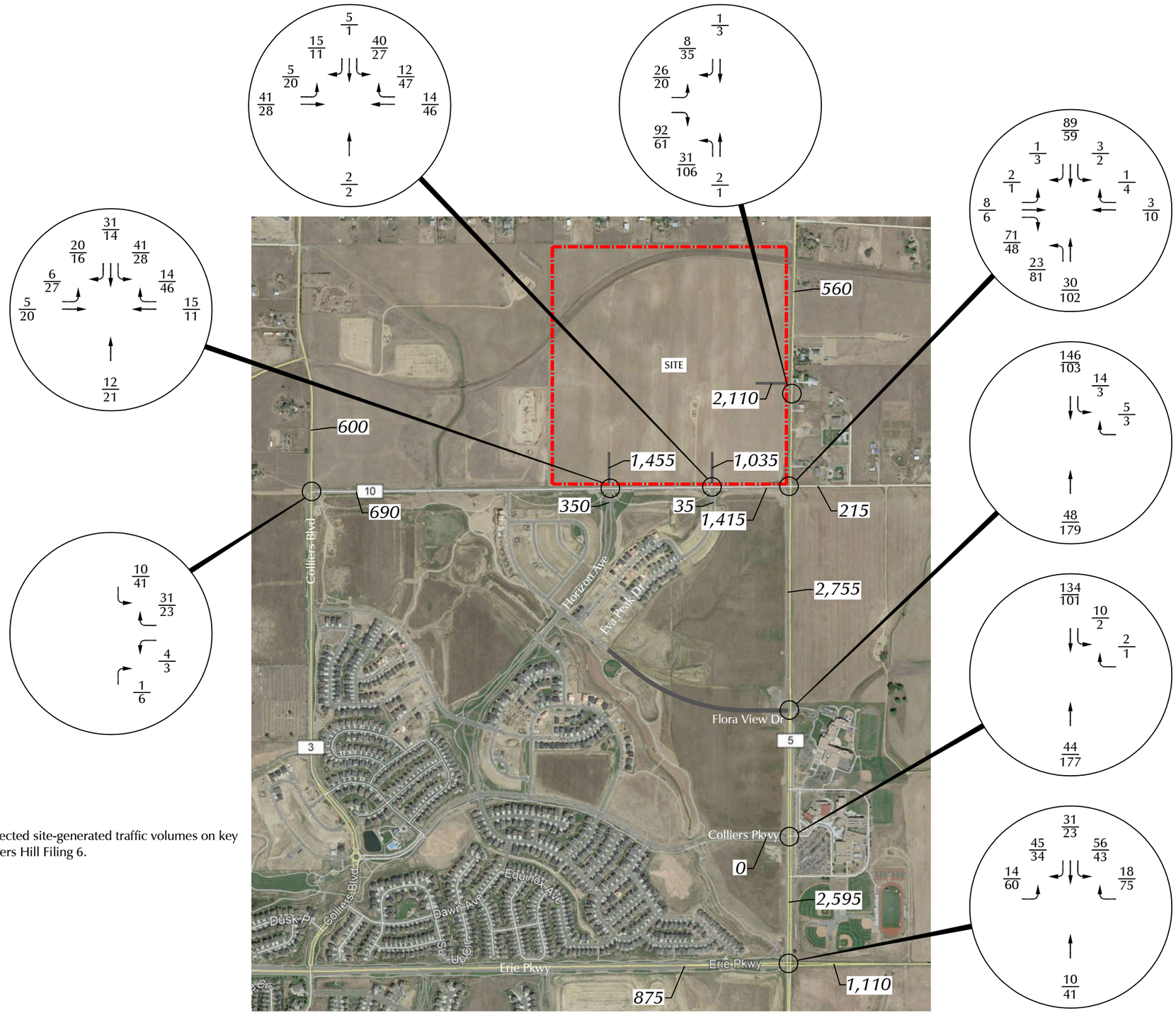
LEGEND:

65% = Percent Directional Distribution

Figure 6

Directional Distribution of Site-Generated Traffic

Colliers Hill Filing 6 (LSC #200870)



Approximate Scale
Scale: 1"= 1,200'

Note: See Figure 7b for projected site-generated traffic volumes on key street segments within Colliers Hill Filing 6.

LEGEND:

$\frac{26}{35}$ = AM Peak Hour Traffic / PM Peak Hour Traffic

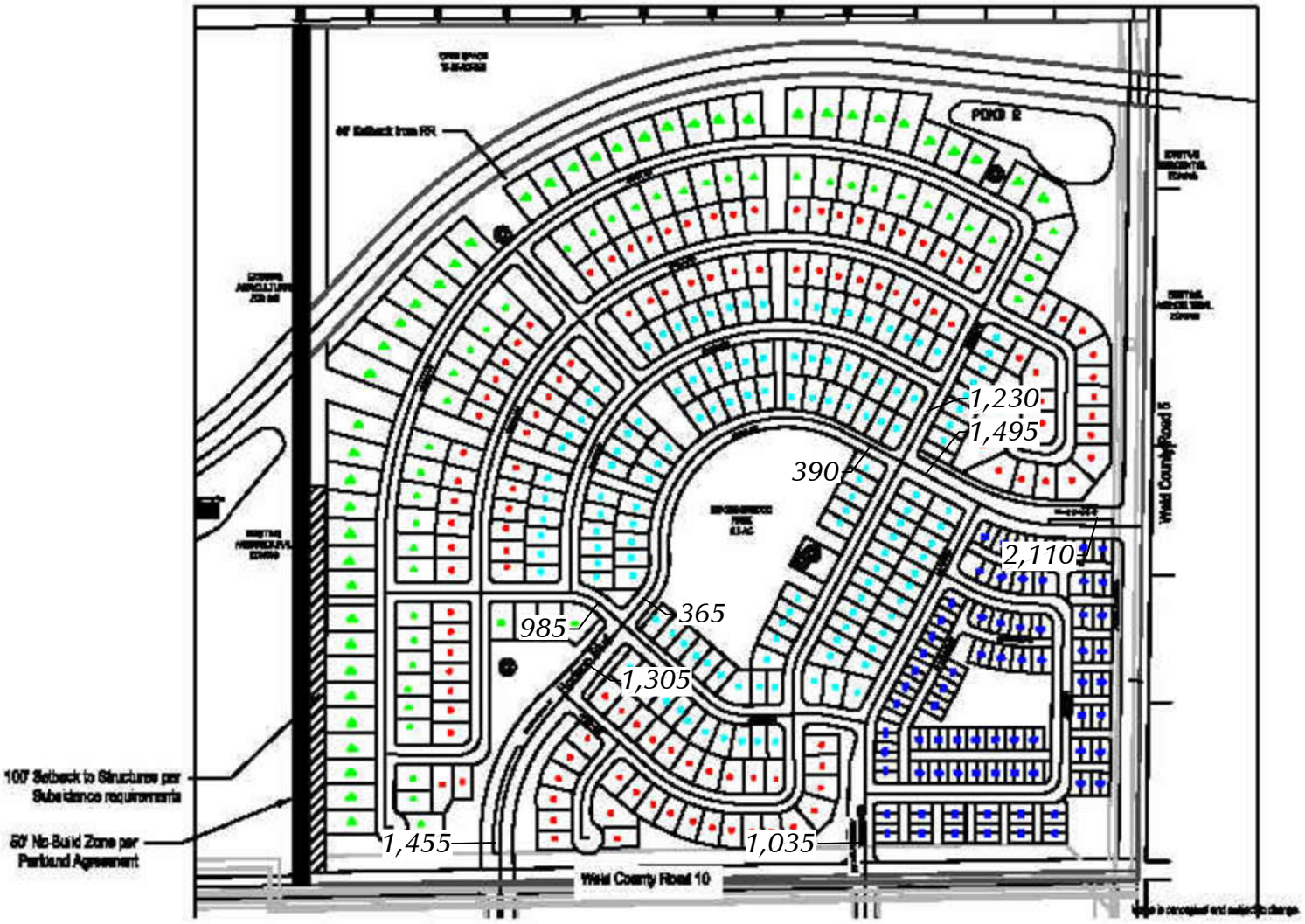
1,000 = Average Daily Traffic

TRANSPORTATION CONSULTANTS, INC.

Figure 7a

Assignment of Site-Generated Traffic

Colliers Hill Filing 6 (LSC #200870)



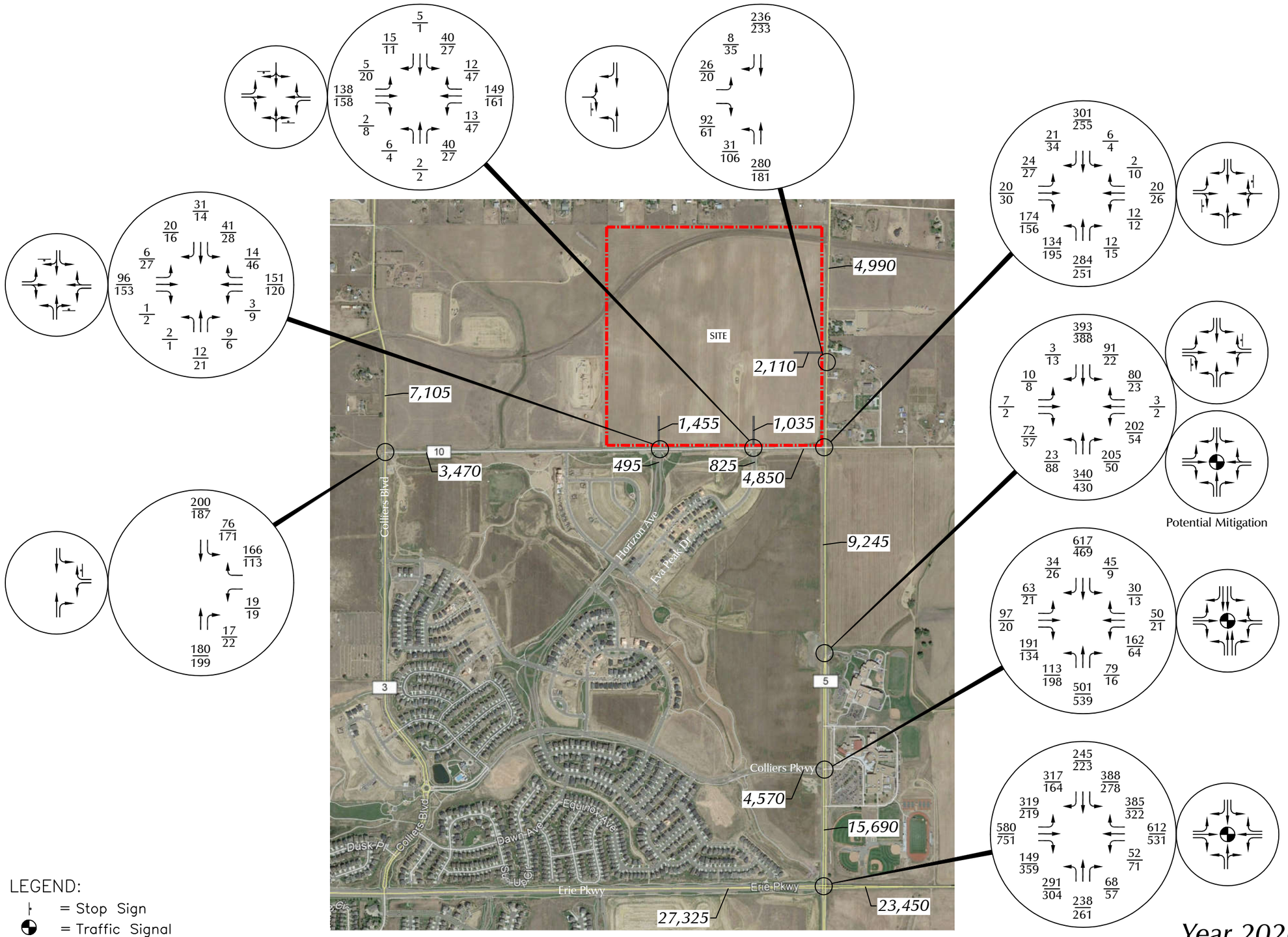
Approximate Scale
Scale: NTS

LEGEND:
1,000 = Average Daily Traffic

Figure 7b

Assignment of Site-Generated Traffic (Detail Area)

Colliers Hill Filing 6 (LSC #200870)



LEGEND:

= Stop Sign

= Traffic Signal

$\frac{26}{35}$ = $\frac{\text{AM Peak Hour Traffic}}{\text{PM Peak Hour Traffic}}$

1,000 = Average Daily Traffic

LSC TRANSPORTATION CONSULTANTS, INC.

Figure 8

Year 2026 Total Traffic, Lane Geometry and Traffic Control

Colliers Hill Filing 6 (LSC #200870)

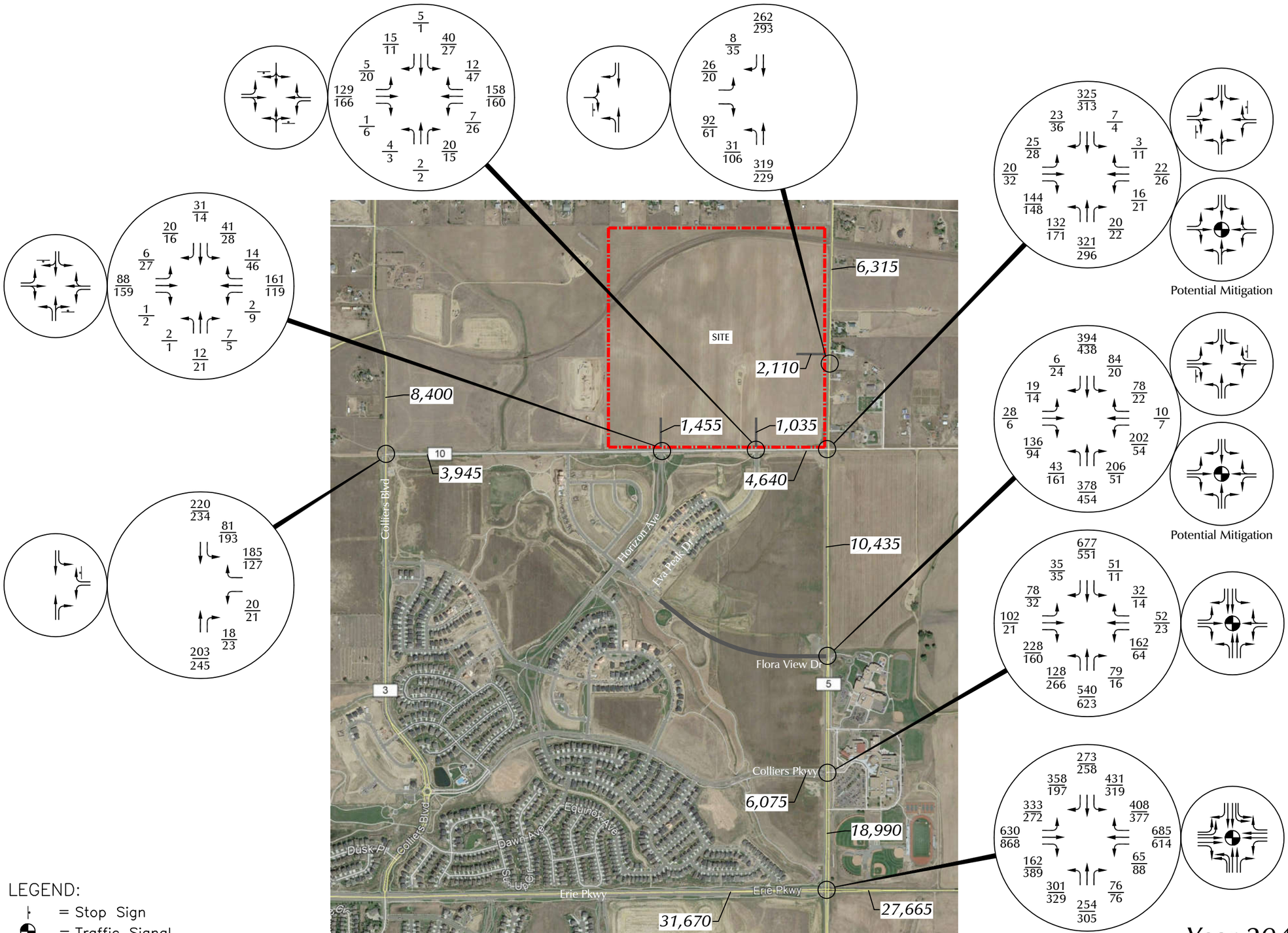


Figure 9

Year 2040 Total Traffic, Lane Geometry and Traffic Control

Colliers Hill Filing 6 (LSC #200870)

COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: COLLIERS PARKWAY
E/W STREET: COUNTY ROAD 10
CITY: ERIE
COUNTY: WELD

File Name : COLLCR10
Site Code : 00000011
Start Date : 12/9/2020
Page No : 1

Groups Printed- VEHICLES

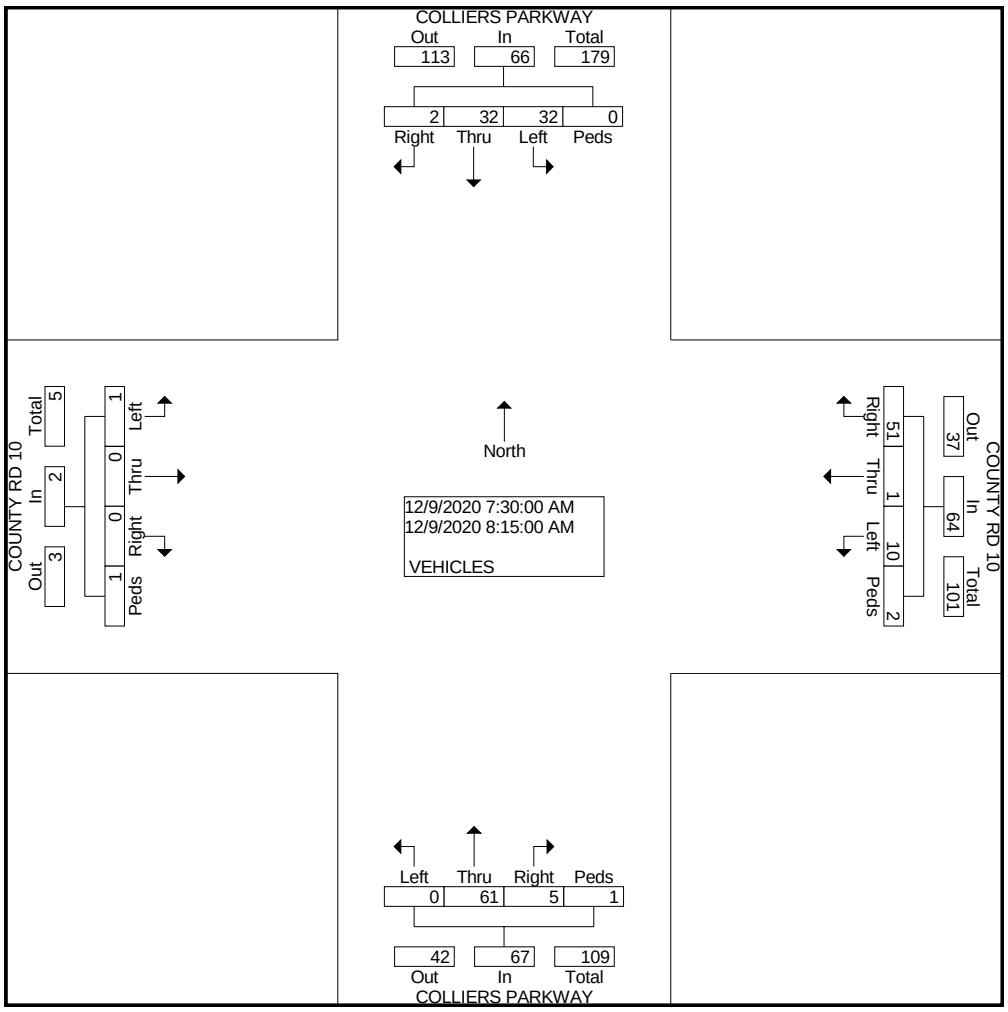
	COLLIERS PARKWAY Southbound				COUNTY RD 10 Westbound				COLLIERS PARKWAY Northbound				COUNTY RD 10 Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	3	4	0	0	3	0	9	0	0	4	0	0	0	0	0	0	23
06:45 AM	2	10	0	0	1	0	10	0	0	7	1	0	0	0	0	0	31
Total	5	14	0	0	4	0	19	0	0	11	1	0	0	0	0	0	54
07:00 AM	9	6	0	0	2	0	16	0	0	16	1	0	0	0	0	0	50
07:15 AM	7	10	0	0	6	0	11	0	0	11	0	0	0	0	0	1	46
07:30 AM	9	7	0	0	2	1	8	0	0	13	2	0	1	0	0	0	43
07:45 AM	11	9	0	0	1	0	20	0	0	13	2	0	0	0	0	0	56
Total	36	32	0	0	11	1	55	0	0	53	5	0	1	0	0	1	195
08:00 AM	4	10	1	0	5	0	13	0	0	20	1	1	0	0	0	1	56
08:15 AM	8	6	1	0	2	0	10	2	0	15	0	0	0	0	0	0	44
Total	12	16	2	0	7	0	23	2	0	35	1	1	0	0	0	1	100
04:00 PM	9	18	0	1	5	0	14	0	0	15	3	2	0	0	0	0	67
04:15 PM	16	32	0	1	6	0	10	0	0	20	5	0	0	0	0	2	92
04:30 PM	15	18	0	3	1	0	14	0	0	20	4	0	0	0	0	0	75
04:45 PM	16	21	0	0	2	0	14	0	0	16	0	0	0	0	0	0	69
Total	56	89	0	5	14	0	52	0	0	71	12	2	0	0	0	2	303
05:00 PM	11	17	0	0	1	1	25	0	0	23	2	0	0	0	0	0	80
05:15 PM	18	22	0	0	1	0	11	0	0	20	2	0	0	0	0	0	74
05:30 PM	18	18	0	0	0	0	12	0	0	9	0	0	0	0	0	0	57
05:45 PM	11	14	0	0	1	0	17	0	0	7	0	0	0	0	0	0	50
Total	58	71	0	0	3	1	65	0	0	59	4	0	0	0	0	0	261
Grand Total	167	222	2	5	39	2	214	2	0	229	23	3	1	0	0	4	913
Apprch %	42.2	56.1	0.5	1.3	15.2	0.8	83.3	0.8	0.0	89.8	9.0	1.2	20.0	0.0	0.0	80.0	
Total %	18.3	24.3	0.2	0.5	4.3	0.2	23.4	0.2	0.0	25.1	2.5	0.3	0.1	0.0	0.0	0.4	

COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: COLLIERS PARKWAY
E/W STREET: COUNTY ROAD 10
CITY: ERIE
COUNTY: WELD

File Name : COLLCR10
Site Code : 00000011
Start Date : 12/9/2020
Page No : 2

	COLLIERS PARKWAY Southbound					COUNTY RD 10 Westbound					COLLIERS PARKWAY Northbound					COUNTY RD 10 Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	07:30 AM																				
Volume	32	32	2	0	66	10	1	51	2	64	0	61	5	1	67	1	0	0	1	2	199
Percent	48.5	48.5	3.0	0.0		15.6	1.6	79.7	3.1		0.0	91.0	7.5	1.5		50.0	0.0	0.0	50.0		
08:00 Volume	4	10	1	0	15	5	0	13	0	18	0	20	1	1	22	0	0	0	1	1	56
Peak Factor																					0.888
High Int.	07:45 AM					07:45 AM					08:00 AM					07:30 AM					
Volume	11	9	0	0	20	1	0	20	0	21	0	20	1	1	22	1	0	0	0	1	
Peak Factor					0.825					0.762					0.761					0.500	

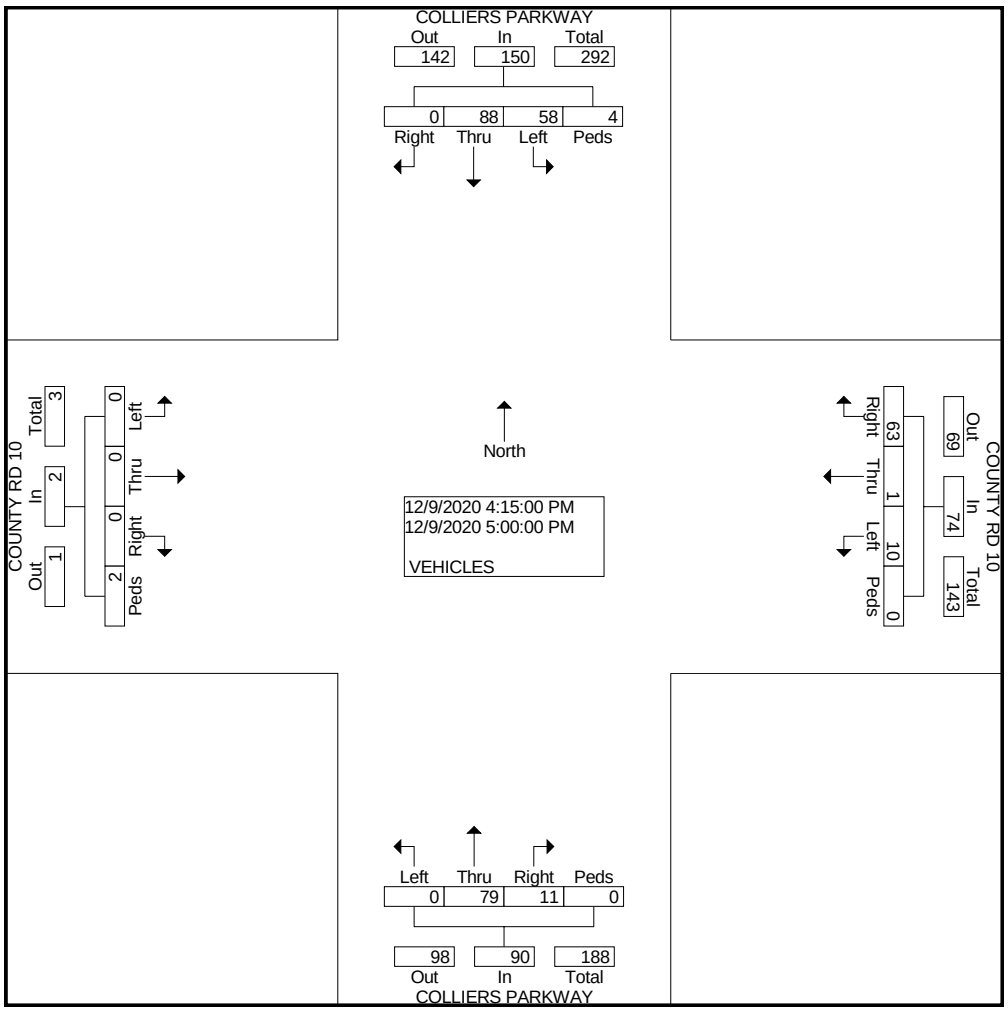


COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: COLLIERS PARKWAY
E/W STREET: COUNTY ROAD 10
CITY: ERIE
COUNTY: WELD

File Name : COLLCR10
Site Code : 00000011
Start Date : 12/9/2020
Page No : 2

	COLLIERS PARKWAY Southbound					COUNTY RD 10 Westbound					COLLIERS PARKWAY Northbound					COUNTY RD 10 Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 04:15 PM to 05:00 PM - Peak 1 of 1																					
Intersection	04:15 PM																				
Volume	58	88	0	4	150	10	1	63	0	74	0	79	11	0	90	0	0	0	2	2	316
Percent	38.7	58.7	0.0	2.7		13.5	1.4	85.1	0.0		0.0	87.8	12.2	0.0		0.0	0.0	0.0	100.0		
04:15 Volume	16	32	0	1	49	6	0	10	0	16	0	20	5	0	25	0	0	0	2	2	92
Peak Factor																					0.859
High Int.	04:15 PM					05:00 PM					04:15 PM					04:15 PM					
Volume	16	32	0	1	49	1	1	25	0	27	0	20	5	0	25	0	0	0	2	2	
Peak Factor					0.765					0.685					0.900					0.250	



COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: CR 5
E/W STREET: COLLIER PARKWAY
CITY: ERIE
COUNTY: WELD

File Name : CR5COLLIER
Site Code : 00000022
Start Date : 12/8/2020
Page No : 1

Groups Printed- VEHICLES

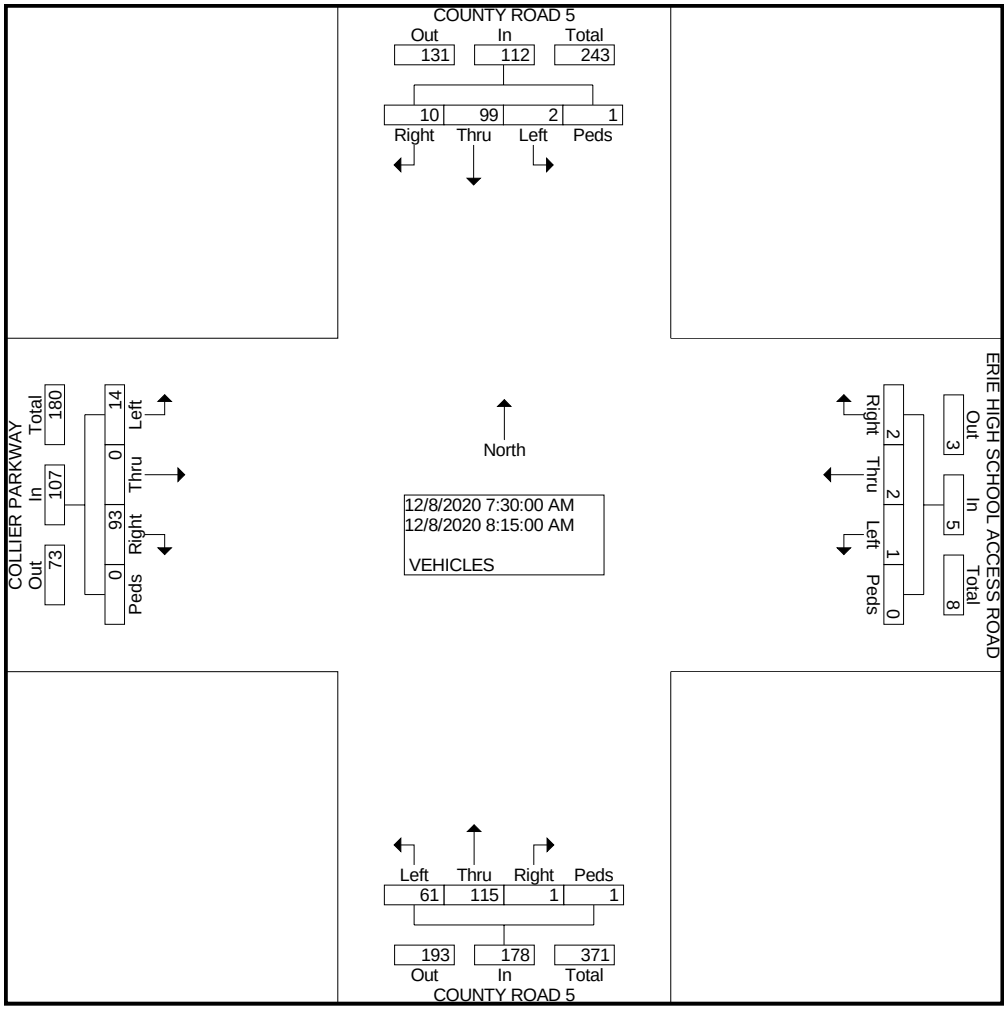
	COUNTY ROAD 5 Southbound				ERIE HIGH SCHOOL ACCESS ROAD Westbound				COUNTY ROAD 5 Northbound				COLLIER PARKWAY Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	1	11	0	0	0	0	0	0	3	14	0	0	0	0	9	0	38
06:45 AM	0	11	0	0	1	0	0	0	15	22	0	0	0	0	5	0	54
Total	1	22	0	0	1	0	0	0	18	36	0	0	0	0	14	0	92
07:00 AM	0	24	2	0	0	0	0	0	5	32	0	0	3	0	16	0	82
07:15 AM	1	18	2	0	0	0	0	0	5	25	0	0	2	0	10	0	63
07:30 AM	0	31	1	0	0	0	0	0	13	24	0	0	4	0	23	0	96
07:45 AM	1	22	2	0	1	0	0	0	12	30	0	0	6	0	24	0	98
Total	2	95	7	0	1	0	0	0	35	111	0	0	15	0	73	0	339
08:00 AM	0	25	4	1	0	0	1	0	14	27	0	1	1	0	27	0	101
08:15 AM	1	21	3	0	0	2	1	0	22	34	1	0	3	0	19	0	107
Total	1	46	7	1	0	2	2	0	36	61	1	1	4	0	46	0	208
04:00 PM	0	32	1	1	0	0	0	0	21	36	0	0	2	0	18	0	111
04:15 PM	0	32	2	0	0	0	0	0	30	41	1	0	2	0	22	0	130
04:30 PM	0	44	6	0	0	0	0	0	23	40	0	0	5	0	22	1	141
04:45 PM	0	26	2	0	0	0	0	0	46	36	0	1	1	0	25	0	137
Total	0	134	11	1	0	0	0	0	120	153	1	1	10	0	87	1	519
05:00 PM	0	50	3	0	1	0	0	0	22	40	0	0	1	1	16	0	134
05:15 PM	0	32	6	0	0	0	0	0	26	35	0	0	2	0	24	0	125
05:30 PM	0	37	4	0	0	0	0	0	22	38	0	0	2	0	17	0	120
05:45 PM	0	20	1	0	0	0	0	0	28	30	0	0	2	0	14	0	95
Total	0	139	14	0	1	0	0	0	98	143	0	0	7	1	71	0	474
Grand Total	4	436	39	2	3	2	2	0	307	504	2	2	36	1	291	1	1632
Apprch %	0.8	90.6	8.1	0.4	42.9	28.6	28.6	0.0	37.7	61.8	0.2	0.2	10.9	0.3	88.4	0.3	
Total %	0.2	26.7	2.4	0.1	0.2	0.1	0.1	0.0	18.8	30.9	0.1	0.1	2.2	0.1	17.8	0.1	

COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: CR 5
E/W STREET: COLLIER PARKWAY
CITY: ERIE
COUNTY: WELD

File Name : CR5COLLIER
Site Code : 00000022
Start Date : 12/8/2020

	COUNTY ROAD 5 Southbound					ERIE HIGH SCHOOL ACCESS ROAD Westbound					COUNTY ROAD 5 Northbound					COLLIER PARKWAY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	07:30 AM																				
Volume	2	99	10	1	112	1	2	2	0	5	61	115	1	1	178	14	0	93	0	107	402
Percent	1.8	88.4	8.9	0.9		20.0	40.0	40.0	0.0		34.3	64.6	0.6	0.6		13.1	0.0	86.9	0.0		
08:15 Volume	1	21	3	0	25	0	2	1	0	3	22	34	1	0	57	3	0	19	0	22	107
Peak Factor																					0.939
High Int.	07:30 AM					08:15 AM					08:15 AM					07:45 AM					
Volume	0	31	1	0	32	0	2	1	0	3	22	34	1	0	57	6	0	24	0	30	
Peak Factor					0.875					0.417					0.781					0.892	

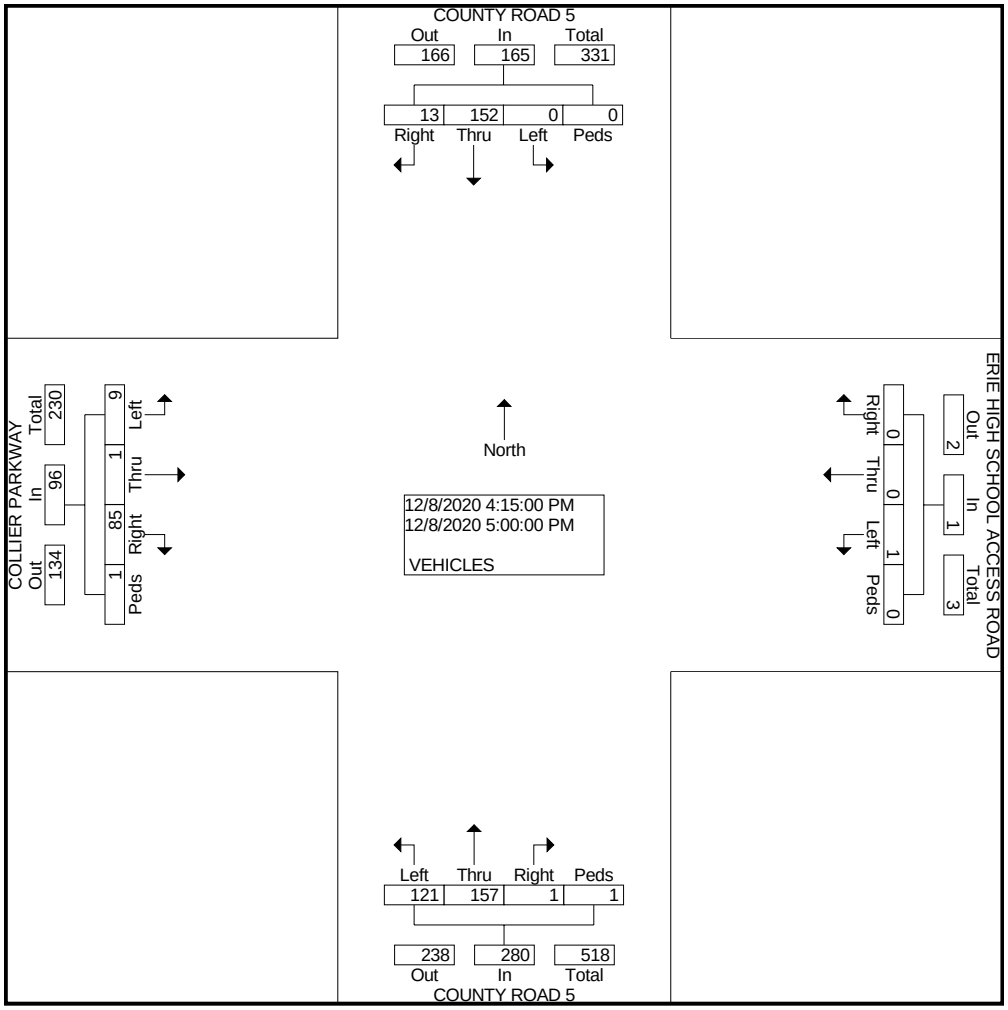


COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: CR 5
E/W STREET: COLLIER PARKWAY
CITY: ERIE
COUNTY: WELD

File Name : CR5COLLIER
Site Code : 00000022
Start Date : 12/8/2020
Page No : 2

	COUNTY ROAD 5 Southbound					ERIE HIGH SCHOOL ACCESS ROAD Westbound					COUNTY ROAD 5 Northbound					COLLIER PARKWAY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 04:15 PM to 05:00 PM - Peak 1 of 1																					
Intersection	04:15 PM																				
Volume	0	152	13	0	165	1	0	0	0	1	121	157	1	1	280	9	1	85	1	96	542
Percent	0.0	92.1	7.9	0.0		100.0	0.0	0.0	0.0		43.2	56.1	0.4	0.4		9.4	1.0	88.5	1.0		
04:30 Volume	0	44	6	0	50	0	0	0	0	0	23	40	0	0	63	5	0	22	1	28	141
Peak Factor																					0.961
High Int.	05:00 PM					05:00 PM					04:45 PM					04:30 PM					
Volume	0	50	3	0	53	1	0	0	0	1	46	36	0	1	83	5	0	22	1	28	
Peak Factor					0.778					0.250					0.843					0.857	



COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET:COUNTY ROAD 5
E/W STREET: COUNTY ROAD 10
CITY: ERIE
COUNTY: WELD

File Name : CR5CR10
Site Code : 00000025
Start Date : 12/9/2020
Page No : 1

Groups Printed- VEHICLES

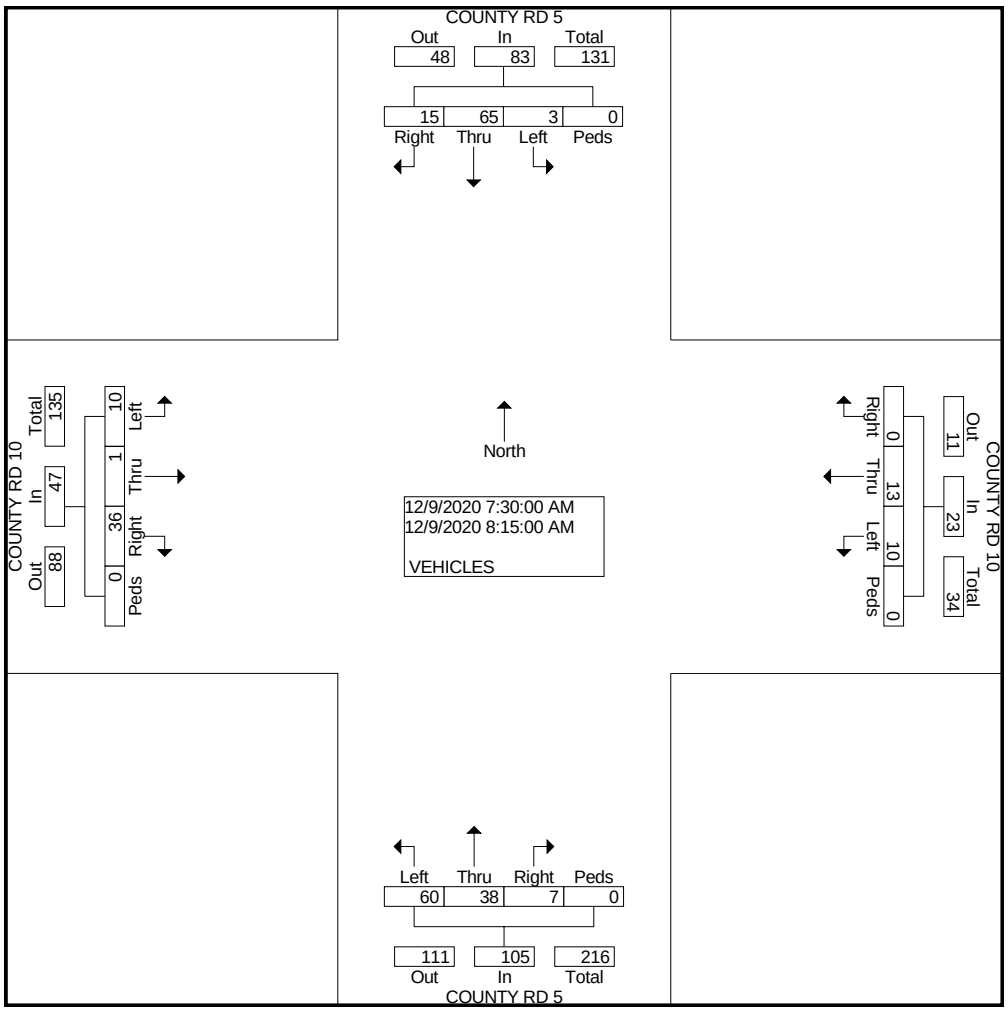
	COUNTY RD 5 Southbound				COUNTY RD 10 Westbound				COUNTY RD 5 Northbound				COUNTY RD 10 Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	0	6	3	0	1	1	0	1	15	6	1	0	0	0	9	0	43
06:45 AM	0	9	0	0	0	2	0	0	17	5	0	0	2	1	5	0	41
Total	0	15	3	0	1	3	0	1	32	11	1	0	2	1	14	0	84
07:00 AM	2	13	2	0	2	1	0	0	24	3	2	0	2	1	10	0	62
07:15 AM	1	15	0	0	3	1	0	0	18	3	2	0	3	2	9	0	57
07:30 AM	2	15	3	0	3	1	0	0	10	8	2	0	0	0	9	0	53
07:45 AM	1	18	3	0	4	4	0	0	17	9	2	0	4	1	12	0	75
Total	6	61	8	0	12	7	0	0	69	23	8	0	9	4	40	0	247
08:00 AM	0	21	5	0	3	6	0	0	18	9	1	0	0	0	5	0	68
08:15 AM	0	11	4	0	0	2	0	0	15	12	2	0	6	0	10	0	62
Total	0	32	9	0	3	8	0	0	33	21	3	0	6	0	15	0	130
04:00 PM	1	18	3	0	2	0	2	0	14	20	0	0	7	3	16	0	86
04:15 PM	1	24	4	0	2	1	0	0	19	24	0	0	6	5	18	0	104
04:30 PM	0	19	4	0	1	0	3	0	15	24	7	0	2	2	26	0	103
04:45 PM	0	14	4	0	1	1	0	0	19	21	2	0	2	2	17	0	83
Total	2	75	15	0	6	2	5	0	67	89	9	0	17	12	77	0	376
05:00 PM	1	12	4	0	2	2	3	0	25	11	3	0	5	7	20	0	95
05:15 PM	1	20	4	0	3	2	1	0	15	21	2	0	2	9	21	0	101
05:30 PM	1	11	3	0	0	0	0	0	19	13	1	0	1	0	16	0	65
05:45 PM	0	8	2	0	0	0	0	0	16	8	0	0	2	2	15	0	53
Total	3	51	13	0	5	4	4	0	75	53	6	0	10	18	72	0	314
Grand Total	11	234	48	0	27	24	9	1	276	197	27	0	44	35	218	0	1151
Apprch %	3.8	79.9	16.4	0.0	44.3	39.3	14.8	1.6	55.2	39.4	5.4	0.0	14.8	11.8	73.4	0.0	
Total %	1.0	20.3	4.2	0.0	2.3	2.1	0.8	0.1	24.0	17.1	2.3	0.0	3.8	3.0	18.9	0.0	

COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET:COUNTY ROAD 5
E/W STREET: COUNTY ROAD 10
CITY: ERIE
COUNTY: WELD

File Name : CR5CR10
Site Code : 00000025
Start Date : 12/9/2020

	COUNTY RD 5 Southbound					COUNTY RD 10 Westbound					COUNTY RD 5 Northbound					COUNTY RD 10 Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	07:30 AM																				
Volume	3	65	15	0	83	10	13	0	0	23	60	38	7	0	105	10	1	36	0	47	258
Percent	3.6	78.3	18.1	0.0		43.5	56.5	0.0	0.0		57.1	36.2	6.7	0.0		21.3	2.1	76.6	0.0		
07:45 Volume	1	18	3	0	22	4	4	0	0	8	17	9	2	0	28	4	1	12	0	17	75
Peak Factor																					0.860
High Int.	08:00 AM					08:00 AM					08:15 AM					07:45 AM					
Volume	0	21	5	0	26	3	6	0	0	9	15	12	2	0	29	4	1	12	0	17	
Peak Factor					0.798					0.639					0.905					0.691	

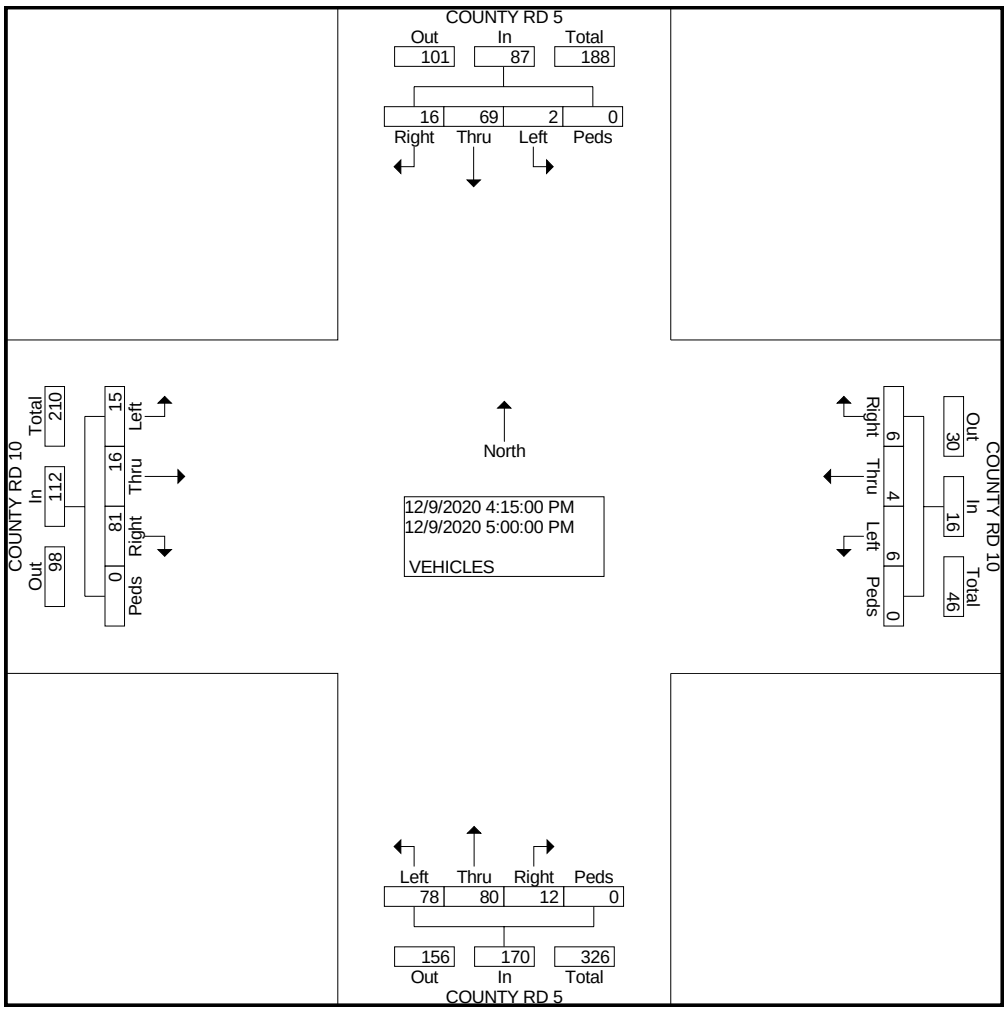


COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET:COUNTY ROAD 5
E/W STREET: COUNTY ROAD 10
CITY: ERIE
COUNTY: WELD

File Name : CR5CR10
Site Code : 00000025
Start Date : 12/9/2020

	COUNTY RD 5 Southbound					COUNTY RD 10 Westbound					COUNTY RD 5 Northbound					COUNTY RD 10 Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 04:15 PM to 05:00 PM - Peak 1 of 1																					
Intersection	04:15 PM																				
Volume	2	69	16	0	87	6	4	6	0	16	78	80	12	0	170	15	16	81	0	112	385
Percent	2.3	79.3	18.4	0.0		37.5	25.0	37.5	0.0		45.9	47.1	7.1	0.0		13.4	14.3	72.3	0.0		
04:15 Volume	1	24	4	0	29	2	1	0	0	3	19	24	0	0	43	6	5	18	0	29	104
Peak Factor																					0.925
High Int.	04:15 PM					05:00 PM					04:30 PM					05:00 PM					
Volume	1	24	4	0	29	2	2	3	0	7	15	24	7	0	46	5	7	20	0	32	
Peak Factor					0.750					0.571					0.924					0.875	



COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: CR 5
E/W STREET: ERIE PARKWAY
CITY: ERIE
COUNTY: WELD

File Name : CR5ERIEPKWY
Site Code : 00000015
Start Date : 12/8/2020
Page No : 1

Groups Printed- VEHICLES

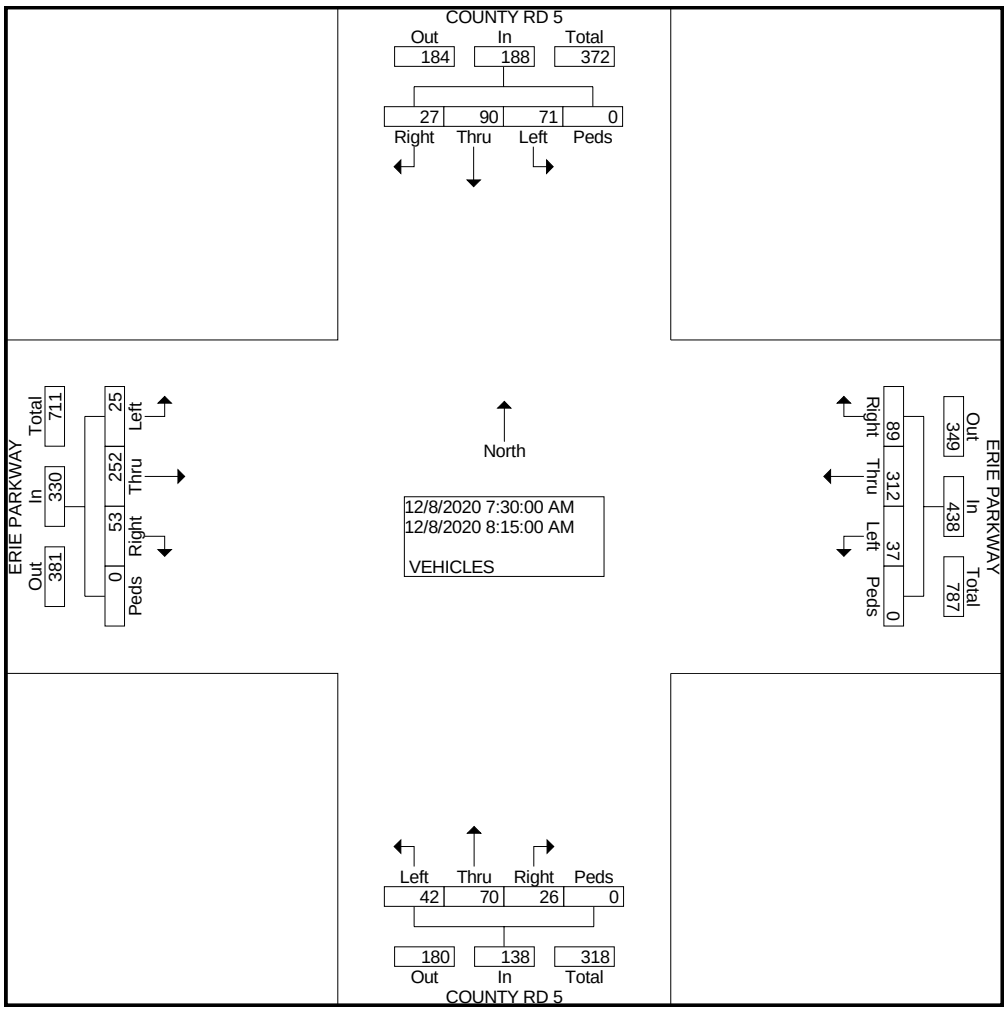
	COUNTY RD 5 Southbound				ERIE PARKWAY Westbound				COUNTY RD 5 Northbound				ERIE PARKWAY Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	14	6	2	0	5	78	13	0	1	5	8	0	1	43	9	0	185
06:45 AM	8	5	3	0	5	84	20	0	5	14	7	0	5	39	9	0	204
Total	22	11	5	0	10	162	33	0	6	19	15	0	6	82	18	0	389
07:00 AM	11	17	11	0	4	62	23	0	9	12	4	0	5	52	7	0	217
07:15 AM	10	12	6	0	7	65	17	0	8	14	3	0	2	37	14	0	195
07:30 AM	22	20	9	0	6	83	20	0	4	13	5	0	5	67	13	0	267
07:45 AM	20	16	9	0	10	93	21	0	18	15	5	0	8	60	11	0	286
Total	63	65	35	0	27	303	81	0	39	54	17	0	20	216	45	0	965
08:00 AM	14	31	5	0	12	80	18	0	10	19	12	0	4	62	16	0	283
08:15 AM	15	23	4	0	9	56	30	0	10	23	4	0	8	63	13	0	258
Total	29	54	9	0	21	136	48	0	20	42	16	0	12	125	29	0	541
04:00 PM	19	28	6	0	3	72	19	0	17	31	4	0	9	106	25	0	339
04:15 PM	28	23	5	0	8	68	34	0	15	25	9	0	8	131	30	0	384
04:30 PM	30	27	8	0	2	72	21	0	18	35	8	0	8	106	39	0	374
04:45 PM	26	23	7	0	3	77	37	0	30	36	3	0	7	103	19	0	371
Total	103	101	26	0	16	289	111	0	80	127	24	0	32	446	113	0	1468
05:00 PM	30	24	8	0	9	70	18	0	30	24	8	0	14	105	21	0	361
05:15 PM	24	28	3	0	5	78	19	0	19	31	10	0	13	76	30	0	336
05:30 PM	32	14	8	0	5	69	21	0	14	31	5	0	6	89	16	0	310
05:45 PM	19	15	3	0	4	64	27	0	30	26	4	0	2	67	13	0	274
Total	105	81	22	0	23	281	85	0	93	112	27	0	35	337	80	0	1281
Grand Total	322	312	97	0	97	1171	358	0	238	354	99	0	105	1206	285	0	4644
Apprch %	44.0	42.7	13.3	0.0	6.0	72.0	22.0	0.0	34.4	51.2	14.3	0.0	6.6	75.6	17.9	0.0	
Total %	6.9	6.7	2.1	0.0	2.1	25.2	7.7	0.0	5.1	7.6	2.1	0.0	2.3	26.0	6.1	0.0	

COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: CR 5
E/W STREET: ERIE PARKWAY
CITY: ERIE
COUNTY: WELD

File Name : CR5ERIEPKWY
Site Code : 00000015
Start Date : 12/8/2020

	COUNTY RD 5 Southbound					ERIE PARKWAY Westbound					COUNTY RD 5 Northbound					ERIE PARKWAY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	07:30 AM																				
Volume	71	90	27	0	188	37	312	89	0	438	42	70	26	0	138	25	252	53	0	330	1094
Percent	37.8	47.9	14.4	0.0		8.4	71.2	20.3	0.0		30.4	50.7	18.8	0.0		7.6	76.4	16.1	0.0		
07:45 Volume	20	16	9	0	45	10	93	21	0	124	18	15	5	0	38	8	60	11	0	79	286
Peak Factor																					0.956
High Int.	07:30 AM					07:45 AM					08:00 AM					07:30 AM					
Volume	22	20	9	0	51	10	93	21	0	124	10	19	12	0	41	5	67	13	0	85	
Peak Factor					0.922					0.883					0.841					0.971	

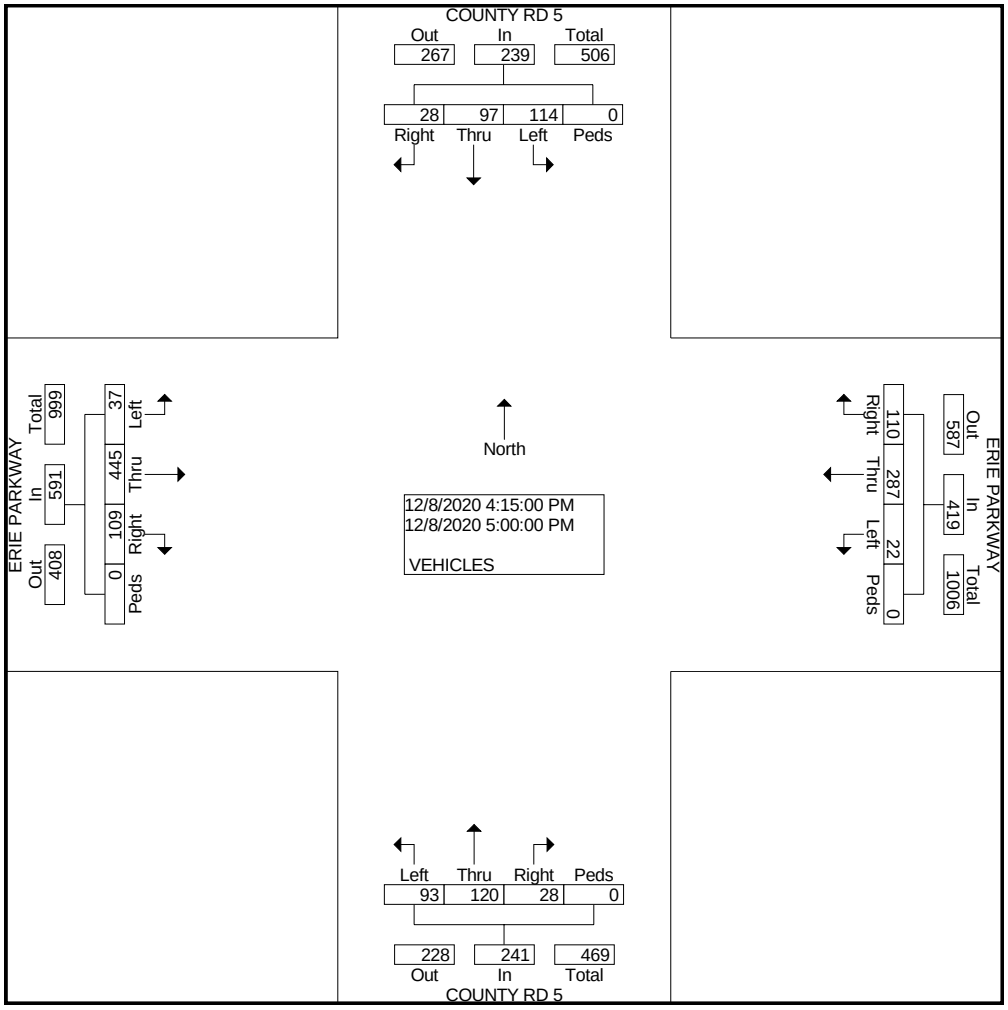


COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: CR 5
E/W STREET: ERIE PARKWAY
CITY: ERIE
COUNTY: WELD

File Name : CR5ERIEPKWY
Site Code : 00000015
Start Date : 12/8/2020

	COUNTY RD 5 Southbound					ERIE PARKWAY Westbound					COUNTY RD 5 Northbound					ERIE PARKWAY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Intersection	04:15 PM																				
Volume	114	97	28	0	239	22	287	110	0	419	93	120	28	0	241	37	445	109	0	591	1490
Percent	47.7	40.6	11.7	0.0		5.3	68.5	26.3	0.0		38.6	49.8	11.6	0.0		6.3	75.3	18.4	0.0		
04:15 Volume	28	23	5	0	56	8	68	34	0	110	15	25	9	0	49	8	131	30	0	169	384
Peak Factor																					0.970
High Int.	04:30 PM					04:45 PM					04:45 PM					04:15 PM					
Volume	30	27	8	0	65	3	77	37	0	117	30	36	3	0	69	8	131	30	0	169	
Peak Factor					0.919					0.895					0.873					0.874	



Location: COLLIERS PARKWAY W-O CR 5
City: ERIE
County: WELD
Direction: EAST/WEST

COUNTER MEASURES INC.
1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Site Code: 201519
Station ID: 201519

Start Time	16-Dec-20 Wed	EASTBOUN	WESTBOUN							Total
12:00 AM		1	4							5
01:00		0	1							1
02:00		1	1							2
03:00		2	2							4
04:00		4	0							4
05:00		16	1							17
06:00		45	14							59
07:00		**97**	58							155
08:00		84	59							143
09:00		68	66							134
10:00		74	57							131
11:00		92	**92**							**184**
12:00 PM		88	88							176
01:00		84	73							157
02:00		**108**	112							**220**
03:00		106	96							202
04:00		107	104							211
05:00		86	**118**							204
06:00		49	83							132
07:00		44	71							115
08:00		18	41							59
09:00		12	16							28
10:00		3	18							21
11:00		3	5							8
Total		1192	1180							2372
Percent		50.3%	49.7%							
AM Peak	-	07:00	11:00	-	-	-	-	-	-	11:00
Vol.	-	97	92	-	-	-	-	-	-	184
PM Peak	-	14:00	17:00	-	-	-	-	-	-	14:00
Vol.	-	108	118	-	-	-	-	-	-	220
Grand Total		1192	1180							2372
Percent		50.3%	49.7%							
ADT		ADT 2,372		AADT 2,372						

COUNTER MEASURES INC.
1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Location: CR 5 N/O COLLIERS PARKWAY
City: ERIE
County: WELD
Direction: NORTH/SOUTH

Site Code: 201520
Station ID: 201520

Start Time	16-Dec-20 Wed	Direction 1	Direction 2							Total
12:00 AM		4	2							6
01:00		2	2							4
02:00		1	2							3
03:00		0	2							2
04:00		1	9							10
05:00		14	25							39
06:00		43	53							96
07:00		81	116							197
08:00		101	110							211
09:00		93	102							195
10:00		102	122							224
11:00		**130**	**141**							**271**
12:00 PM		129	124							253
01:00		130	116							246
02:00		173	**163**							336
03:00		286	118							404
04:00		**354**	114							**468**
05:00		272	133							405
06:00		172	62							234
07:00		79	26							105
08:00		73	25							98
09:00		47	9							56
10:00		23	11							34
11:00		14	5							19
Total		2324	1592							3916
Percent		59.3%	40.7%							
AM Peak	-	11:00	11:00	-	-	-	-	-	-	11:00
Vol.	-	130	141	-	-	-	-	-	-	271
PM Peak	-	16:00	14:00	-	-	-	-	-	-	16:00
Vol.	-	354	163	-	-	-	-	-	-	468
Grand Total		2324	1592							3916
Percent		59.3%	40.7%							
ADT		ADT 3,177		AADT 3,177						

COUNTER MEASURES INC.
1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Location: CR 5 N/O ERIE PARKWAY
City: ERIE
County: WELD
Direction: NORTH/SOUTH

Site Code: 201518
Station ID: 201518

Start Time	16-Dec-20 Wed	NORTHBOU	SOUTHBOU							Total
12:00 AM		7	3							10
01:00		2	1							3
02:00		2	2							4
03:00		2	5							7
04:00		1	13							14
05:00		18	40							58
06:00		58	90							148
07:00		151	177							328
08:00		154	178							332
09:00		150	170							320
10:00		177	199							376
11:00		**212**	**237**							**449**
12:00 PM		209	221							430
01:00		209	190							399
02:00		**251**	**266**							**517**
03:00		218	247							465
04:00		251	245							496
05:00		222	210							432
06:00		166	108							274
07:00		104	72							176
08:00		78	52							130
09:00		49	28							77
10:00		31	9							40
11:00		0	0							0
Total		2722	2763							5485
Percent		49.6%	50.4%							
AM Peak	-	11:00	11:00	-	-	-	-	-	-	11:00
Vol.	-	212	237	-	-	-	-	-	-	449
PM Peak	-	14:00	14:00	-	-	-	-	-	-	14:00
Vol.	-	251	266	-	-	-	-	-	-	517
Grand Total		2722	2763							5485
Percent		49.6%	50.4%							
ADT		ADT 5,485		AADT 5,485						

COUNTER MEASURES INC.
1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Location: ERIE PARKWAY E/O COUNTY ROAD 5
City: ERIE
County: WELD
Direction: EAST/WEST

Site Code: 201516
Station ID: 201516

Start Time	16-Dec-20 Wed	EASTBOUN	WESTBOUN							Total
12:00 AM		30	20							50
01:00		17	12							29
02:00		16	8							24
03:00		19	11							30
04:00		50	15							65
05:00		193	101							294
06:00		492	303							795
07:00		**678**	**401**							**1079**
08:00		666	385							1051
09:00		475	300							775
10:00		365	294							659
11:00		513	299							812
12:00 PM		543	304							847
01:00		411	300							711
02:00		426	352							778
03:00		**559**	367							**926**
04:00		512	414							926
05:00		504	**417**							921
06:00		275	285							560
07:00		154	178							332
08:00		106	145							251
09:00		48	80							128
10:00		30	62							92
11:00		32	34							66
Total		7114	5087							12201
Percent		58.3%	41.7%							
AM Peak	-	07:00	07:00	-	-	-	-	-	-	07:00
Vol.	-	678	401	-	-	-	-	-	-	1079
PM Peak	-	15:00	17:00	-	-	-	-	-	-	15:00
Vol.	-	559	417	-	-	-	-	-	-	926
Grand Total		7114	5087							12201
Percent		58.3%	41.7%							
ADT		ADT 8,339		AADT 8,339						

COUNTER MEASURES INC.
1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Location: ERIE PARKWAY W/O CR 5
City: ERIE
County: WELD
EAST/WEST

Site Code: 201508
Station ID: 201508

Start Time	16-Dec-20 Wed	EASTBOUN	WESTBOUN							Total
12:00 AM		16	14							30
01:00		6	8							14
02:00		8	9							17
03:00		20	10							30
04:00		58	16							74
05:00		176	72							248
06:00		320	267							587
07:00		496	358							854
08:00		508	**386**							894
09:00		481	284							765
10:00		496	330							826
11:00		**586**	318							**904**
12:00 PM		558	322							880
01:00		500	299							799
02:00		675	376							1051
03:00		860	400							1260
04:00		**870**	422							**1292**
05:00		796	**424**							1220
06:00		447	270							717
07:00		234	188							422
08:00		168	126							294
09:00		94	78							172
10:00		50	47							97
11:00		39	31							70
Total		8462	5055							13517
Percent		62.6%	37.4%							
AM Peak	-	11:00	08:00	-	-	-	-	-	-	11:00
Vol.	-	586	386	-	-	-	-	-	-	904
PM Peak	-	16:00	17:00	-	-	-	-	-	-	16:00
Vol.	-	870	424	-	-	-	-	-	-	1292
Grand Total		8462	5055							13517
Percent		62.6%	37.4%							
ADT		ADT 13,517		AADT 13,517						

LEVEL OF SERVICE DEFINITIONS

From *Highway Capacity Manual*, Transportation Research Board, 2016, 6th Edition

SIGNALIZED INTERSECTION LEVEL OF SERVICE (LOS)

LOS	Average Vehicle Delay sec/vehicle	Operational Characteristics
A	<10 seconds	Describes operations with low control delay, up to 10 sec/veh. This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.
B	10 to 20 seconds	Describes operations with control delay greater than 10 seconds and up to 20 sec/veh. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.
C	20 to 35 seconds	Describes operations with control delay greater than 20 and up to 35 sec/veh. These higher delays may result from only fair progression, longer cycle length, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles, and overflows occur. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.
D	35 to 55 seconds	Describes operations with control delay greater than 35 and up to 55 sec/veh. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	55 to 80 seconds	Describes operations with control delay greater than 55 and up to 80 sec/veh. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.
F	>80 seconds	Describes operations with control delay in excess of 80 sec/veh. This level, considered unacceptable to most drivers, often occurs with over-saturation, that is, when arrival flow rates exceed the capacity of lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

LEVEL OF SERVICE DEFINITIONS

From *Highway Capacity Manual*, Transportation Research Board, 2016, 6th Edition

UNSIGNALIZED INTERSECTION LEVEL OF SERVICE (LOS)

Applicable to Two-Way Stop Control, All-Way Stop Control, and Roundabouts

LOS	Average Vehicle Control Delay	Operational Characteristics
A	<10 seconds	Normally, vehicles on the stop-controlled approach only have to wait up to 10 seconds before being able to clear the intersection. Left-turning vehicles on the uncontrolled street do not have to wait to make their turn.
B	10 to 15 seconds	Vehicles on the stop-controlled approach will experience delays before being able to clear the intersection. The delay could be up to 15 seconds. Left-turning vehicles on the uncontrolled street may have to wait to make their turn.
C	15 to 25 seconds	Vehicles on the stop-controlled approach can expect delays in the range of 15 to 25 seconds before clearing the intersection. Motorists may begin to take chances due to the long delays, thereby posing a safety risk to through traffic. Left-turning vehicles on the uncontrolled street will now be required to wait to make their turn causing a queue to be created in the turn lane.
D	25 to 35 seconds	This is the point at which a traffic signal may be warranted for this intersection. The delays for the stop-controlled intersection are not considered to be excessive. The length of the queue may begin to block other public and private access points.
E	35 to 50 seconds	The delays for all critical traffic movements are considered to be unacceptable. The length of the queues for the stop-controlled approaches as well as the left-turn movements are extremely long. There is a high probability that this intersection will meet traffic signal warrants. The ability to install a traffic signal is affected by the location of other existing traffic signals. Consideration may be given to restricting the accesses by eliminating the left-turn movements from and to the stop-controlled approach.
F	>50 seconds	The delay for the critical traffic movements are probably in excess of 100 seconds. The length of the queues are extremely long. Motorists are selecting alternative routes due to the long delays. The only remedy for these long delays is installing a traffic signal or restricting the accesses. The potential for accidents at this intersection are extremely high due to motorist taking more risky chances. If the median permits, motorists begin making two-stage left-turns.

Intersection	
Int Delay, s/veh	4.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	52	61	5	32	32
Future Vol, veh/h	10	52	61	5	32	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	200	-	200	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	58	69	6	36	36

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	177	69	0	0	75	0
Stage 1	69	-	-	-	-	-
Stage 2	108	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	813	994	-	-	1524	-
Stage 1	954	-	-	-	-	-
Stage 2	916	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	793	994	-	-	1524	-
Mov Cap-2 Maneuver	793	-	-	-	-	-
Stage 1	954	-	-	-	-	-
Stage 2	894	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	3.7
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	793	994	1524	-
HCM Lane V/C Ratio	-	-	0.014	0.059	0.024	-
HCM Control Delay (s)	-	-	9.6	8.8	7.4	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.2	0.1	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	1	36	10	13	0	60	38	7	3	65	15
Future Vol, veh/h	10	1	36	10	13	0	60	38	7	3	65	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	-	-	-	200	-	-	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	1	42	12	15	0	70	44	8	3	76	17

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	278	274	76	300	287	48	93	0	0	52	0	0
Stage 1	82	82	-	188	188	-	-	-	-	-	-	-
Stage 2	196	192	-	112	99	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	674	633	985	652	623	1021	1501	-	-	1554	-	-
Stage 1	926	827	-	814	745	-	-	-	-	-	-	-
Stage 2	806	742	-	893	813	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	636	602	985	600	592	1021	1501	-	-	1554	-	-
Mov Cap-2 Maneuver	636	602	-	600	592	-	-	-	-	-	-	-
Stage 1	882	825	-	776	710	-	-	-	-	-	-	-
Stage 2	752	707	-	852	811	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	11.3	4.3	0.3
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1501	-	-	636	968	595	1554	-	-
HCM Lane V/C Ratio	0.046	-	-	0.018	0.044	0.045	0.002	-	-
HCM Control Delay (s)	7.5	-	-	10.8	8.9	11.3	7.3	0	-
HCM Lane LOS	A	-	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.1	0.1	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	14	1	93	1	2	61	115	1	2	99
Future Volume (vph)	14	1	93	1	2	61	115	1	2	99
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4		3	8	5	2		1	6
Permitted Phases	4		4	8		2		2	6	
Detector Phase	7	4	4	3	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0	10.0	23.0
Total Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	47.0	47.0	10.0	47.0
Total Split (%)	11.1%	25.6%	25.6%	11.1%	25.6%	11.1%	52.2%	52.2%	11.1%	52.2%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max
Act Effct Green (s)	6.7	5.9	5.9	6.7	5.9	53.4	53.7	53.7	50.4	47.6
Actuated g/C Ratio	0.10	0.08	0.08	0.10	0.08	0.77	0.77	0.77	0.72	0.68
v/c Ratio	0.09	0.01	0.37	0.01	0.03	0.07	0.09	0.00	0.00	0.09
Control Delay	28.0	31.0	6.7	26.0	26.5	3.4	4.9	0.0	3.5	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.0	31.0	6.7	26.0	26.5	3.4	4.9	0.0	3.5	6.6
LOS	C	C	A	C	C	A	A	A	A	A
Approach Delay		9.7			26.4		4.3			6.5
Approach LOS		A			C		A			A

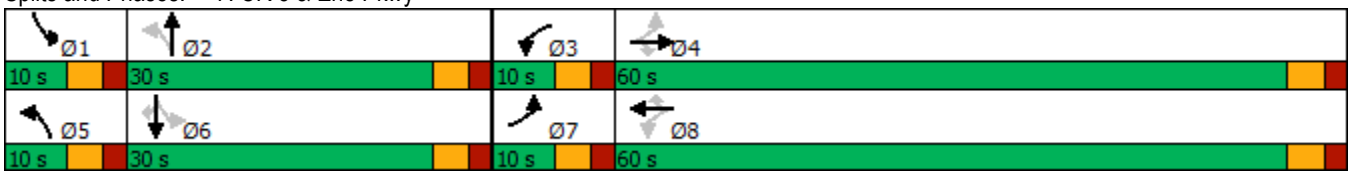
Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 69.7	
Natural Cycle: 70	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.37	
Intersection Signal Delay: 6.6	Intersection LOS: A
Intersection Capacity Utilization 28.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: CR 5 & Colliers Pkwy/Erie HS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	25	252	53	37	312	89	42	70	71	90	27
Future Volume (vph)	25	252	53	37	312	89	42	70	71	90	27
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases	4		4	8		8	2		6		6
Detector Phase	7	4	4	3	8	8	5	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0
Total Split (s)	10.0	60.0	60.0	10.0	60.0	60.0	10.0	30.0	10.0	30.0	30.0
Total Split (%)	9.1%	54.5%	54.5%	9.1%	54.5%	54.5%	9.1%	27.3%	9.1%	27.3%	27.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	62.0	60.4	60.4	62.9	62.3	62.3	13.4	9.7	14.4	12.0	12.0
Actuated g/C Ratio	0.69	0.67	0.67	0.70	0.69	0.69	0.15	0.11	0.16	0.13	0.13
v/c Ratio	0.03	0.21	0.05	0.05	0.25	0.08	0.20	0.48	0.34	0.38	0.09
Control Delay	5.7	9.6	0.1	5.8	9.0	1.3	31.9	41.2	35.0	42.5	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.7	9.6	0.1	5.8	9.0	1.3	31.9	41.2	35.0	42.5	0.6
LOS	A	A	A	A	A	A	C	D	C	D	A
Approach Delay		7.7			7.2			38.3		33.6	
Approach LOS		A			A			D		C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 89.7	
Natural Cycle: 70	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 15.8	Intersection LOS: B
Intersection Capacity Utilization 43.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 7: CR 5 & Erie Pkwy



Intersection	
Int Delay, s/veh	3.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	64	79	11	58	88
Future Vol, veh/h	10	64	79	11	58	88
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	200	-	200	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	74	92	13	67	102

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	328	92	0	0	105	0
Stage 1	92	-	-	-	-	-
Stage 2	236	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	666	965	-	-	1486	-
Stage 1	932	-	-	-	-	-
Stage 2	803	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	636	965	-	-	1486	-
Mov Cap-2 Maneuver	636	-	-	-	-	-
Stage 1	932	-	-	-	-	-
Stage 2	767	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.2	0	3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	636	965	1486	-
HCM Lane V/C Ratio	-	-	0.018	0.077	0.045	-
HCM Control Delay (s)	-	-	10.8	9	7.5	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.2	0.1	-

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	16	81	6	4	6	78	80	12	2	69	16
Future Vol, veh/h	15	16	81	6	4	6	78	80	12	2	69	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	-	-	-	200	-	-	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	17	87	6	4	6	84	86	13	2	74	17

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	344	345	74	400	356	93	91	0	0	99	0	0
Stage 1	78	78	-	261	261	-	-	-	-	-	-	-
Stage 2	266	267	-	139	95	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	610	578	988	560	570	964	1504	-	-	1494	-	-
Stage 1	931	830	-	744	692	-	-	-	-	-	-	-
Stage 2	739	688	-	864	816	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	576	545	988	477	538	964	1504	-	-	1494	-	-
Mov Cap-2 Maneuver	576	545	-	477	538	-	-	-	-	-	-	-
Stage 1	879	829	-	702	653	-	-	-	-	-	-	-
Stage 2	688	649	-	771	815	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.9	11.1	3.5	0.2
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1504	-	-	576	871	610	1494	-	-
HCM Lane V/C Ratio	0.056	-	-	0.028	0.12	0.028	0.001	-	-
HCM Control Delay (s)	7.5	-	-	11.4	9.7	11.1	7.4	0	-
HCM Lane LOS	A	-	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	0.4	0.1	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT	Ø1
Lane Configurations										
Traffic Volume (vph)	9	1	85	1	1	121	157	1	152	
Future Volume (vph)	9	1	85	1	1	121	157	1	152	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	NA	
Protected Phases	7	4		3	8	5	2		6	1
Permitted Phases	4		4	8		2		2		
Detector Phase	7	4	4	3	8	5	2	2	6	
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0	23.0	10.0
Total Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	47.0	47.0	47.0	10.0
Total Split (%)	11.1%	25.6%	25.6%	11.1%	25.6%	11.1%	52.2%	52.2%	52.2%	11%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	Max	None
Act Effct Green (s)	6.5	5.7	5.7	6.5	5.7	53.5	54.6	54.6	46.8	
Actuated g/C Ratio	0.09	0.08	0.08	0.09	0.08	0.78	0.79	0.79	0.68	
v/c Ratio	0.05	0.01	0.34	0.01	0.01	0.14	0.11	0.00	0.14	
Control Delay	27.3	31.0	5.4	26.0	31.0	3.4	3.1	0.0	6.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	27.3	31.0	5.4	26.0	31.0	3.4	3.1	0.0	6.6	
LOS	C	C	A	C	C	A	A	A	A	
Approach Delay		7.7			28.5		3.2		6.6	
Approach LOS		A			C		A		A	

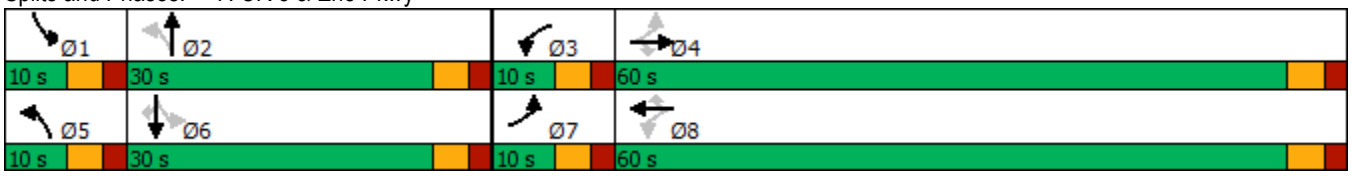
Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 68.7	
Natural Cycle: 70	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.34	
Intersection Signal Delay: 5.1	Intersection LOS: A
Intersection Capacity Utilization 35.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: CR 5 & Colliers Pkwy/Erie HS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	37	445	109	22	287	110	93	120	114	97	28
Future Volume (vph)	37	445	109	22	287	110	93	120	114	97	28
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases	4		4	8		8	2		6		6
Detector Phase	7	4	4	3	8	8	5	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0
Total Split (s)	10.0	60.0	60.0	10.0	60.0	60.0	10.0	30.0	10.0	30.0	30.0
Total Split (%)	9.1%	54.5%	54.5%	9.1%	54.5%	54.5%	9.1%	27.3%	9.1%	27.3%	27.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	59.2	57.4	57.4	58.3	55.5	55.5	17.8	12.7	18.9	15.0	15.0
Actuated g/C Ratio	0.63	0.61	0.61	0.62	0.59	0.59	0.19	0.14	0.20	0.16	0.16
v/c Ratio	0.06	0.40	0.11	0.04	0.27	0.12	0.36	0.60	0.52	0.34	0.09
Control Delay	6.9	12.3	2.3	6.9	11.7	2.3	34.0	46.7	39.6	40.7	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.9	12.3	2.3	6.9	11.7	2.3	34.0	46.7	39.6	40.7	0.5
LOS	A	B	A	A	B	A	C	D	D	D	A
Approach Delay		10.1			9.0			41.8		35.3	
Approach LOS		B			A			D		D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 94	
Natural Cycle: 70	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 19.0	Intersection LOS: B
Intersection Capacity Utilization 57.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 7: CR 5 & Erie Pkwy



Intersection	
Int Delay, s/veh	3.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	135	180	16	66	200
Future Vol, veh/h	15	135	180	16	66	200
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	200	-	200	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	152	202	18	74	225

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	575	202	0	0	220	0
Stage 1	202	-	-	-	-	-
Stage 2	373	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	480	839	-	-	1349	-
Stage 1	832	-	-	-	-	-
Stage 2	696	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	454	839	-	-	1349	-
Mov Cap-2 Maneuver	454	-	-	-	-	-
Stage 1	832	-	-	-	-	-
Stage 2	658	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.5	0	1.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	454	839	1349	-
HCM Lane V/C Ratio	-	-	0.037	0.181	0.055	-
HCM Control Delay (s)	-	-	13.2	10.2	7.8	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.7	0.2	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	91	1	3	136	2	9
Future Vol, veh/h	91	1	3	136	2	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	225	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	106	1	3	158	2	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	107	0	271	107
Stage 1	-	-	-	-	107	-
Stage 2	-	-	-	-	164	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1484	-	718	947
Stage 1	-	-	-	-	917	-
Stage 2	-	-	-	-	865	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1484	-	717	947
Mov Cap-2 Maneuver	-	-	-	-	717	-
Stage 1	-	-	-	-	917	-
Stage 2	-	-	-	-	863	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	717	947	-	-	1484	-
HCM Lane V/C Ratio	0.003	0.011	-	-	0.002	-
HCM Control Delay (s)	10	8.8	-	-	7.4	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	97	2	13	135	6	40
Future Vol, veh/h	97	2	13	135	6	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	225	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	113	2	15	157	7	47

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	115	0	301	114
Stage 1	-	-	-	-	114	-
Stage 2	-	-	-	-	187	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1474	-	691	939
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	845	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1474	-	684	939
Mov Cap-2 Maneuver	-	-	-	-	684	-
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	837	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	895	-	-	1474	-
HCM Lane V/C Ratio	0.06	-	-	0.01	-
HCM Control Delay (s)	9.3	-	-	7.5	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	12	103	12	17	1	111	254	12	3	212	20
Future Vol, veh/h	22	12	103	12	17	1	111	254	12	3	212	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	-	-	-	200	-	-	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	14	120	14	20	1	129	295	14	3	247	23

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	824	820	247	892	836	302	270	0	0	309	0	0
Stage 1	253	253	-	560	560	-	-	-	-	-	-	-
Stage 2	571	567	-	332	276	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	292	310	792	263	303	738	1293	-	-	1252	-	-
Stage 1	751	698	-	513	511	-	-	-	-	-	-	-
Stage 2	506	507	-	681	682	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	254	278	792	198	272	738	1293	-	-	1252	-	-
Mov Cap-2 Maneuver	254	278	-	198	272	-	-	-	-	-	-	-
Stage 1	676	696	-	462	460	-	-	-	-	-	-	-
Stage 2	435	456	-	565	680	-	-	-	-	-	-	-

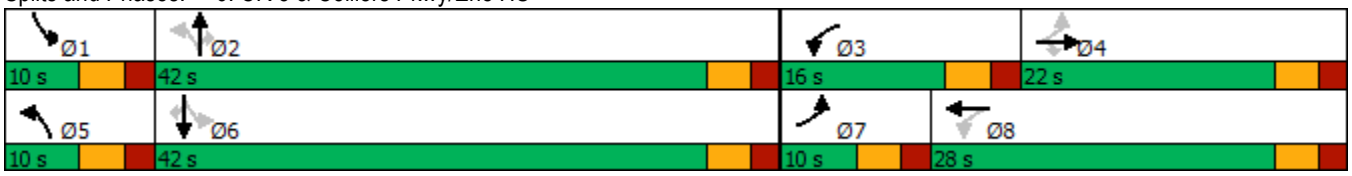
Approach	EB	WB	NB	SB
HCM Control Delay, s	13.2	22.4	2.4	0.1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1293	-	-	254	664	241	1252	-	-
HCM Lane V/C Ratio	0.1	-	-	0.101	0.201	0.145	0.003	-	-
HCM Control Delay (s)	8.1	-	-	20.8	11.8	22.4	7.9	0	-
HCM Lane LOS	A	-	-	C	B	C	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0.3	0.7	0.5	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	63	97	191	162	50	113	457	79	35	483	34
Future Volume (vph)	63	97	191	162	50	113	457	79	35	483	34
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	10.0	22.0	22.0	16.0	28.0	10.0	42.0	42.0	10.0	42.0	42.0
Total Split (%)	11.1%	24.4%	24.4%	17.8%	31.1%	11.1%	46.7%	46.7%	11.1%	46.7%	46.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
Act Effct Green (s)	18.7	13.7	13.7	29.8	22.1	41.1	37.3	37.3	41.1	37.3	37.3
Actuated g/C Ratio	0.22	0.16	0.16	0.35	0.26	0.48	0.44	0.44	0.48	0.44	0.44
v/c Ratio	0.22	0.65	0.47	0.86	0.33	0.28	0.31	0.19	0.16	0.33	0.04
Control Delay	21.8	44.4	8.7	47.0	24.1	12.6	17.2	1.7	11.4	17.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.8	44.4	8.7	47.0	24.1	12.6	17.2	1.7	11.4	17.4	0.1
LOS	C	D	A	D	C	B	B	A	B	B	A
Approach Delay		25.5			39.5		13.3			15.7	
Approach LOS		C			D		B			B	

Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 84.8		
Natural Cycle: 70		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.86		
Intersection Signal Delay: 21.8	Intersection LOS: C	
Intersection Capacity Utilization 47.8%	ICU Level of Service A	
Analysis Period (min) 15		

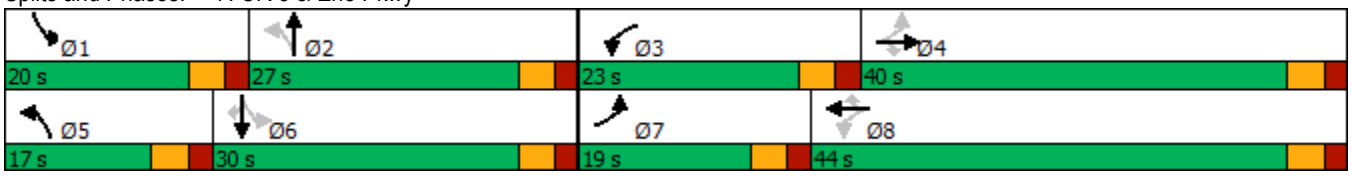
Splits and Phases: 6: CR 5 & Colliers Pkwy/Erie HS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	305	580	149	52	612	367	291	228	332	214	272
Future Volume (vph)	305	580	149	52	612	367	291	228	332	214	272
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases	4		4	8		8	2		6		6
Detector Phase	7	4	4	3	8	8	5	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0
Total Split (s)	19.0	40.0	40.0	23.0	44.0	44.0	17.0	27.0	20.0	30.0	30.0
Total Split (%)	17.3%	36.4%	36.4%	20.9%	40.0%	40.0%	15.5%	24.5%	18.2%	27.3%	27.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	60.0	50.2	50.2	50.1	41.0	41.0	36.3	22.3	42.4	25.3	25.3
Actuated g/C Ratio	0.55	0.46	0.46	0.46	0.38	0.38	0.33	0.21	0.39	0.23	0.23
v/c Ratio	0.97	0.70	0.19	0.17	0.90	0.46	0.75	0.81	0.99	0.51	0.48
Control Delay	73.1	30.2	6.5	13.4	50.5	4.3	38.6	57.2	76.2	40.7	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.1	30.2	6.5	13.4	50.5	4.3	38.6	57.2	76.2	40.7	7.0
LOS	E	C	A	B	D	A	D	E	E	D	A
Approach Delay		39.4			32.2			48.0		43.9	
Approach LOS		D			C			D		D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 108.4	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 39.8	Intersection LOS: D
Intersection Capacity Utilization 97.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 7: CR 5 & Erie Pkwy



Intersection	
Int Delay, s/veh	159.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	7	72	202	3	75	23	292	205	77	247	3
Future Vol, veh/h	10	7	72	202	3	75	23	292	205	77	247	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	60	-	60	-	-	0	250	-	0	250	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	50	92	50	92	94	50	50	94	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	8	78	404	3	150	25	311	410	154	263	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1214	1342	263	977	935	311	266	0	0	721	0	0
Stage 1	571	571	-	361	361	-	-	-	-	-	-	-
Stage 2	643	771	-	616	574	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	158	152	776	~ 230	265	729	1298	-	-	881	-	-
Stage 1	506	505	-	657	626	-	-	-	-	-	-	-
Stage 2	462	410	-	478	503	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	106	123	776	~ 168	214	729	1298	-	-	881	-	-
Mov Cap-2 Maneuver	106	123	-	~ 168	214	-	-	-	-	-	-	-
Stage 1	496	417	-	645	614	-	-	-	-	-	-	-
Stage 2	358	402	-	~ 348	415	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.9	$ 516	0.3	3.6
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1298	-	-	106	123	776	168	729	881	-	-
HCM Lane V/C Ratio	0.019	-	-	0.103	0.062	0.101	2.424	0.206	0.175	-	-
HCM Control Delay (s)	7.8	-	-	42.8	36.2	10.2	$ 701.9	11.2	9.9	-	-
HCM Lane LOS	A	-	-	E	E	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.2	0.3	34.4	0.8	0.6	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	3.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	90	199	16	130	187
Future Vol, veh/h	16	90	199	16	130	187
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	200	-	200	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	19	105	231	19	151	217

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	750	231	0	0	250	0
Stage 1	231	-	-	-	-	-
Stage 2	519	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	379	808	-	-	1316	-
Stage 1	807	-	-	-	-	-
Stage 2	597	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	335	808	-	-	1316	-
Mov Cap-2 Maneuver	335	-	-	-	-	-
Stage 1	807	-	-	-	-	-
Stage 2	528	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.1	0	3.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	335	808	1316	-
HCM Lane V/C Ratio	-	-	0.056	0.13	0.115	-
HCM Control Delay (s)	-	-	16.4	10.1	8.1	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.4	0.4	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	133	2	9	109	1	6
Future Vol, veh/h	133	2	9	109	1	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	225	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	143	2	10	117	1	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	145	0	281	144
Stage 1	-	-	-	-	144	-
Stage 2	-	-	-	-	137	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1437	-	709	903
Stage 1	-	-	-	-	883	-
Stage 2	-	-	-	-	890	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1437	-	704	903
Mov Cap-2 Maneuver	-	-	-	-	704	-
Stage 1	-	-	-	-	883	-
Stage 2	-	-	-	-	884	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	704	903	-	-	1437	-
HCM Lane V/C Ratio	0.002	0.007	-	-	0.007	-
HCM Control Delay (s)	10.1	9	-	-	7.5	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	130	8	47	115	4	27
Future Vol, veh/h	130	8	47	115	4	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	225	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	140	9	51	124	4	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	149	0	371	145
Stage 1	-	-	-	-	145	-
Stage 2	-	-	-	-	226	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1432	-	630	902
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	812	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1432	-	607	902
Mov Cap-2 Maneuver	-	-	-	-	607	-
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	783	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.2	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	849	-	-	1432	-
HCM Lane V/C Ratio	0.039	-	-	0.035	-
HCM Control Delay (s)	9.4	-	-	7.6	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	24	108	12	16	6	114	149	15	2	196	31
Future Vol, veh/h	26	24	108	12	16	6	114	149	15	2	196	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	-	-	-	200	-	-	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	26	116	13	17	6	123	160	16	2	211	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	641	637	211	717	662	168	244	0	0	176	0	0
Stage 1	215	215	-	414	414	-	-	-	-	-	-	-
Stage 2	426	422	-	303	248	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	388	395	829	345	382	876	1322	-	-	1400	-	-
Stage 1	787	725	-	616	593	-	-	-	-	-	-	-
Stage 2	606	588	-	706	701	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	344	357	829	260	346	876	1322	-	-	1400	-	-
Mov Cap-2 Maneuver	344	357	-	260	346	-	-	-	-	-	-	-
Stage 1	714	724	-	559	538	-	-	-	-	-	-	-
Stage 2	528	533	-	584	700	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.6	16.7	3.3	0.1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1322	-	-	344	668	343	1400	-	-
HCM Lane V/C Ratio	0.093	-	-	0.081	0.212	0.107	0.002	-	-
HCM Control Delay (s)	8	-	-	16.4	11.8	16.7	7.6	0	-
HCM Lane LOS	A	-	-	C	B	C	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0.3	0.8	0.4	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	21	20	134	64	21	198	362	16	7	368	26
Future Volume (vph)	21	20	134	64	21	198	362	16	7	368	26
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	47.0	47.0	10.0	47.0	47.0
Total Split (%)	11.1%	25.6%	25.6%	11.1%	25.6%	11.1%	52.2%	52.2%	11.1%	52.2%	52.2%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
Act Effct Green (s)	10.9	7.0	7.0	12.9	11.0	51.8	50.9	50.9	47.7	42.7	42.7
Actuated g/C Ratio	0.14	0.09	0.09	0.17	0.14	0.67	0.66	0.66	0.61	0.55	0.55
v/c Ratio	0.10	0.12	0.51	0.29	0.13	0.31	0.16	0.02	0.01	0.20	0.03
Control Delay	25.5	34.5	13.1	28.8	24.1	7.1	6.8	0.0	5.4	9.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.5	34.5	13.1	28.8	24.1	7.1	6.8	0.0	5.4	9.9	0.0
LOS	C	C	B	C	C	A	A	A	A	A	A
Approach Delay		17.0			27.2		6.7			9.2	
Approach LOS		B			C		A			A	

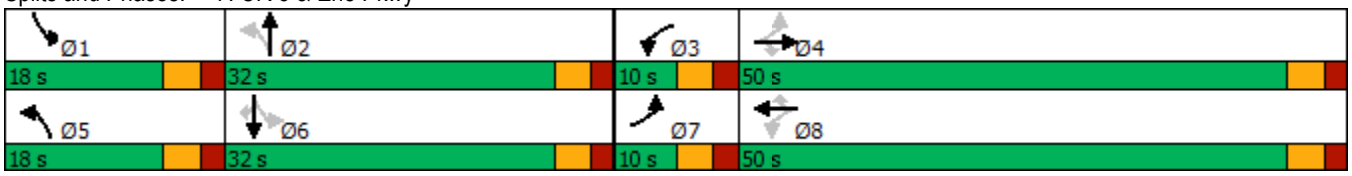
Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 77.6		
Natural Cycle: 70		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.51		
Intersection Signal Delay: 10.5	Intersection LOS: B	
Intersection Capacity Utilization 43.9%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 6: CR 5 & Colliers Pkwy/Erie HS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	159	751	359	71	531	247	304	220	235	200	130
Future Volume (vph)	159	751	359	71	531	247	304	220	235	200	130
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases	4		4	8		8	2		6		6
Detector Phase	7	4	4	3	8	8	5	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0
Total Split (s)	10.0	50.0	50.0	10.0	50.0	50.0	18.0	32.0	18.0	32.0	32.0
Total Split (%)	9.1%	45.5%	45.5%	9.1%	45.5%	45.5%	16.4%	29.1%	16.4%	29.1%	29.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	51.3	47.3	47.3	50.2	45.1	45.1	33.4	20.4	32.3	19.8	19.8
Actuated g/C Ratio	0.50	0.46	0.46	0.49	0.44	0.44	0.32	0.20	0.31	0.19	0.19
v/c Ratio	0.55	0.91	0.43	0.46	0.67	0.31	0.82	0.78	0.77	0.58	0.34
Control Delay	23.4	43.9	9.3	23.4	29.2	3.6	44.7	53.2	41.3	44.1	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.4	43.9	9.3	23.4	29.2	3.6	44.7	53.2	41.3	44.1	8.0
LOS	C	D	A	C	C	A	D	D	D	D	A
Approach Delay		31.6			21.3			48.7		34.3	
Approach LOS		C			C			D		C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 103.1	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 32.4	Intersection LOS: C
Intersection Capacity Utilization 88.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 7: CR 5 & Erie Pkwy



Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	2	51	54	2	20	88	251	50	19	285	13
Future Vol, veh/h	8	2	51	54	2	20	88	251	50	19	285	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	60	-	60	-	-	0	250	-	0	250	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	93	92	93	92	93	93	93	93	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	2	55	58	2	22	96	270	54	20	306	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	847	862	306	844	822	270	320	0	0	324	0	0
Stage 1	346	346	-	462	462	-	-	-	-	-	-	-
Stage 2	501	516	-	382	360	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	282	293	734	283	309	769	1240	-	-	1236	-	-
Stage 1	670	635	-	580	565	-	-	-	-	-	-	-
Stage 2	552	534	-	640	626	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	253	266	734	242	281	769	1240	-	-	1236	-	-
Mov Cap-2 Maneuver	253	266	-	242	281	-	-	-	-	-	-	-
Stage 1	618	625	-	535	521	-	-	-	-	-	-	-
Stage 2	493	493	-	580	616	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.8	20.7	1.9	0.5
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1240	-	-	253	266	734	243	769	1236	-	-
HCM Lane V/C Ratio	0.077	-	-	0.034	0.008	0.076	0.248	0.028	0.017	-	-
HCM Control Delay (s)	8.1	-	-	19.7	18.6	10.3	24.6	9.8	8	-	-
HCM Lane LOS	A	-	-	C	C	B	C	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	0	0.2	0.9	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	19	166	180	17	76	200
Future Vol, veh/h	19	166	180	17	76	200
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	200	-	200	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	187	202	19	85	225

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	597	202	0	0	221	0
Stage 1	202	-	-	-	-	-
Stage 2	395	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	466	839	-	-	1348	-
Stage 1	832	-	-	-	-	-
Stage 2	681	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	437	839	-	-	1348	-
Mov Cap-2 Maneuver	437	-	-	-	-	-
Stage 1	832	-	-	-	-	-
Stage 2	638	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	2.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	437	839	1348	-
HCM Lane V/C Ratio	-	-	0.049	0.222	0.063	-
HCM Control Delay (s)	-	-	13.7	10.5	7.9	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.8	0.2	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	96	1	3	151	14	2	12	9	41	31	20
Future Vol, veh/h	6	96	1	3	151	14	2	12	9	41	31	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	225	-	-	175	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	86	86	86	86	92	86	92	86	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	112	1	3	176	15	2	13	10	45	34	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	191	0	0	113	0	0	345	324	113	328	317	184
Stage 1	-	-	-	-	-	-	127	127	-	190	190	-
Stage 2	-	-	-	-	-	-	218	197	-	138	127	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1383	-	-	1476	-	-	609	594	940	625	599	858
Stage 1	-	-	-	-	-	-	877	791	-	812	743	-
Stage 2	-	-	-	-	-	-	784	738	-	865	791	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1383	-	-	1476	-	-	565	590	940	604	595	858
Mov Cap-2 Maneuver	-	-	-	-	-	-	565	590	-	604	595	-
Stage 1	-	-	-	-	-	-	873	787	-	808	742	-
Stage 2	-	-	-	-	-	-	728	737	-	837	787	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.1	10.4	11.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	565	707	1383	-	-	1476	-	-	604	676
HCM Lane V/C Ratio	0.004	0.033	0.005	-	-	0.002	-	-	0.074	0.082
HCM Control Delay (s)	11.4	10.3	7.6	-	-	7.4	-	-	11.4	10.8
HCM Lane LOS	B	B	A	-	-	A	-	-	B	B
HCM 95th %tile Q(veh)	0	0.1	0	-	-	0	-	-	0.2	0.3

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	138	2	13	149	12	6	2	40	40	5	15
Future Vol, veh/h	5	138	2	13	149	12	6	2	40	40	5	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	225	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	86	86	86	86	92	86	92	86	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	160	2	15	173	13	7	2	47	43	5	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	186	0	0	162	0	0	391	387	161	406	382	180
Stage 1	-	-	-	-	-	-	171	171	-	210	210	-
Stage 2	-	-	-	-	-	-	220	216	-	196	172	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1388	-	-	1417	-	-	568	547	884	555	551	863
Stage 1	-	-	-	-	-	-	831	757	-	792	728	-
Stage 2	-	-	-	-	-	-	782	724	-	806	756	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1388	-	-	1417	-	-	547	539	884	518	543	863
Mov Cap-2 Maneuver	-	-	-	-	-	-	547	539	-	518	543	-
Stage 1	-	-	-	-	-	-	828	754	-	789	720	-
Stage 2	-	-	-	-	-	-	753	716	-	759	753	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.6	9.8	12
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	802	1388	-	-	1417	-	-	578
HCM Lane V/C Ratio	0.069	0.004	-	-	0.011	-	-	0.113
HCM Control Delay (s)	9.8	7.6	-	-	7.6	-	-	12
HCM Lane LOS	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.4

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	20	174	12	20	2	134	284	12	6	301	21
Future Vol, veh/h	24	20	174	12	20	2	134	284	12	6	301	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	-	-	-	200	-	-	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	23	200	14	23	2	154	326	14	7	346	24

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1014	1008	346	1125	1025	333	370	0	0	340	0	0
Stage 1	360	360	-	641	641	-	-	-	-	-	-	-
Stage 2	654	648	-	484	384	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	217	240	697	182	235	709	1189	-	-	1219	-	-
Stage 1	658	626	-	463	469	-	-	-	-	-	-	-
Stage 2	456	466	-	564	611	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	177	207	697	107	203	709	1189	-	-	1219	-	-
Mov Cap-2 Maneuver	177	207	-	107	203	-	-	-	-	-	-	-
Stage 1	572	622	-	403	408	-	-	-	-	-	-	-
Stage 2	373	405	-	385	607	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.1	34.9	2.6	0.1
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1189	-	-	177	560	159	1219	-	-
HCM Lane V/C Ratio	0.13	-	-	0.156	0.398	0.246	0.006	-	-
HCM Control Delay (s)	8.5	-	-	29.1	15.6	34.9	8	0	-
HCM Lane LOS	A	-	-	D	C	D	A	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0.5	1.9	0.9	0	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	26	92	31	280	236	8
Future Vol, veh/h	26	92	31	280	236	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	300	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	86	86	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	100	34	326	274	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	673	279	283	0	-	0
Stage 1	279	-	-	-	-	-
Stage 2	394	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	421	760	1279	-	-	-
Stage 1	768	-	-	-	-	-
Stage 2	681	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	410	760	1279	-	-	-
Mov Cap-2 Maneuver	410	-	-	-	-	-
Stage 1	747	-	-	-	-	-
Stage 2	681	-	-	-	-	-

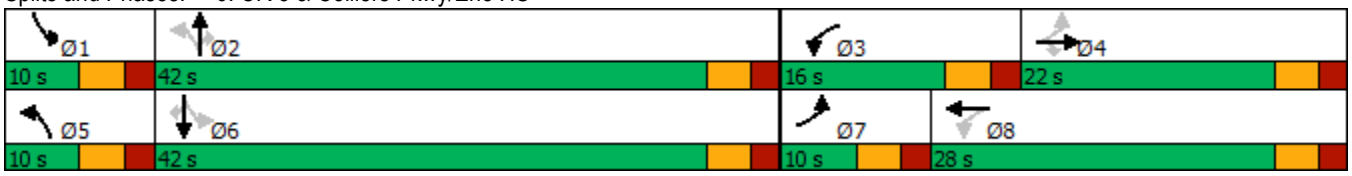
Approach	EB	NB	SB
HCM Control Delay, s	12	0.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1279	-	640	-	-
HCM Lane V/C Ratio	0.026	-	0.2	-	-
HCM Control Delay (s)	7.9	-	12	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	63	97	191	162	50	113	501	79	45	617	34
Future Volume (vph)	63	97	191	162	50	113	501	79	45	617	34
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	10.0	22.0	22.0	16.0	28.0	10.0	42.0	42.0	10.0	42.0	42.0
Total Split (%)	11.1%	24.4%	24.4%	17.8%	31.1%	11.1%	46.7%	46.7%	11.1%	46.7%	46.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
Act Effct Green (s)	18.7	13.7	13.7	29.8	22.1	41.1	37.3	37.3	41.1	37.3	37.3
Actuated g/C Ratio	0.22	0.16	0.16	0.35	0.26	0.48	0.44	0.44	0.48	0.44	0.44
v/c Ratio	0.22	0.65	0.47	0.86	0.33	0.33	0.34	0.19	0.21	0.42	0.04
Control Delay	21.8	44.4	8.7	47.0	24.1	13.5	17.5	1.7	11.9	18.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.8	44.4	8.7	47.0	24.1	13.5	17.5	1.7	11.9	18.5	0.1
LOS	C	D	A	D	C	B	B	A	B	B	A
Approach Delay		25.5			39.4		13.8			16.9	
Approach LOS		C			D		B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 84.8	
Natural Cycle: 70	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 21.8	Intersection LOS: C
Intersection Capacity Utilization 51.5%	ICU Level of Service A
Analysis Period (min) 15	

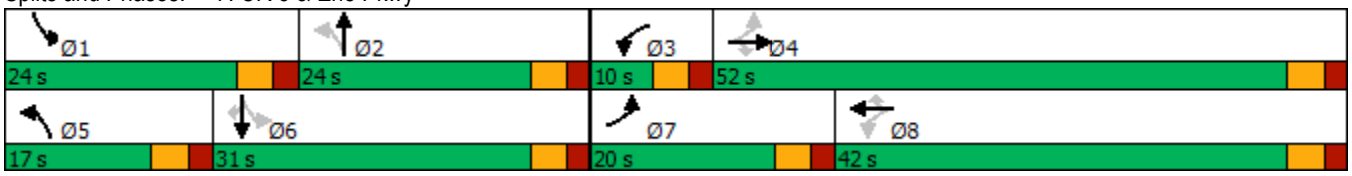
Splits and Phases: 6: CR 5 & Colliers Pkwy/Erie HS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	319	580	149	52	612	385	291	238	388	245	317
Future Volume (vph)	319	580	149	52	612	385	291	238	388	245	317
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases	4		4	8		8	2		6		6
Detector Phase	7	4	4	3	8	8	5	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0
Total Split (s)	20.0	52.0	52.0	10.0	42.0	42.0	17.0	24.0	24.0	31.0	31.0
Total Split (%)	18.2%	47.3%	47.3%	9.1%	38.2%	38.2%	15.5%	21.8%	21.8%	28.2%	28.2%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	59.0	51.0	51.0	46.0	39.0	39.0	34.9	20.9	44.9	27.9	27.9
Actuated g/C Ratio	0.54	0.46	0.46	0.42	0.35	0.35	0.32	0.19	0.41	0.25	0.25
v/c Ratio	0.98	0.70	0.19	0.19	0.97	0.49	0.76	0.91	1.00	0.54	0.54
Control Delay	74.9	29.5	2.8	14.8	63.3	4.7	38.7	72.2	75.2	40.4	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.9	29.5	2.8	14.8	63.3	4.7	38.7	72.2	75.2	40.4	10.0
LOS	E	C	A	B	E	A	D	E	E	D	A
Approach Delay		39.5			39.4			55.9		44.5	
Approach LOS		D			D			E		D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 109.9	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 43.5	Intersection LOS: D
Intersection Capacity Utilization 101.4%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 7: CR 5 & Erie Pkwy



Intersection	
Int Delay, s/veh	285.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	7	72	202	3	80	23	340	205	91	393	3
Future Vol, veh/h	10	7	72	202	3	80	23	340	205	91	393	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	60	-	60	-	-	0	250	-	0	250	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	50	92	50	92	94	50	50	94	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	8	78	404	3	160	25	362	410	182	418	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1481	1604	418	1239	1197	362	421	0	0	772	0	0
Stage 1	782	782	-	412	412	-	-	-	-	-	-	-
Stage 2	699	822	-	827	785	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	103	105	635	~ 152	186	683	1138	-	-	843	-	-
Stage 1	387	405	-	617	594	-	-	-	-	-	-	-
Stage 2	430	388	-	~ 366	404	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	64	81	635	~ 102	143	683	1138	-	-	843	-	-
Mov Cap-2 Maneuver	64	81	-	~ 102	143	-	-	-	-	-	-	-
Stage 1	378	318	-	603	581	-	-	-	-	-	-	-
Stage 2	320	379	-	~ 246	317	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.7	$ 1031.9	0.3	3.1
HCM LOS	C	F		

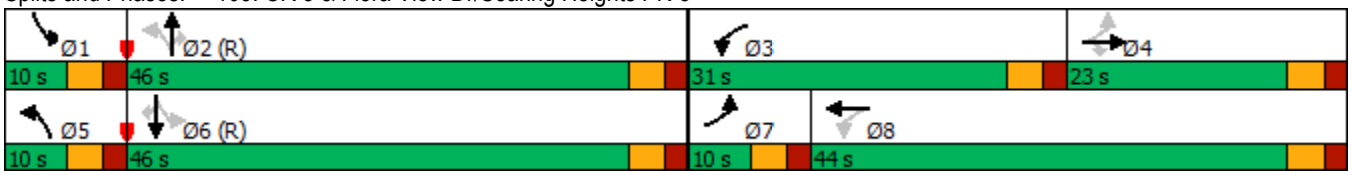
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1138	-	-	64	81	635	102	683	843	-	-
HCM Lane V/C Ratio	0.022	-	-	0.17	0.094	0.123	3.993	0.234	0.216	-	-
HCM Control Delay (s)	8.2	-	-	72.4	54	11.5	$ 1432.6	11.9	10.4	-	-
HCM Lane LOS	A	-	-	F	F	B	F	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	0.3	0.4	41.8	0.9	0.8	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	10	7	72	202	3	23	340	205	91	393	3
Future Volume (vph)	10	7	72	202	3	23	340	205	91	393	3
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	10.0	23.0	23.0	31.0	44.0	10.0	46.0	46.0	10.0	46.0	46.0
Total Split (%)	9.1%	20.9%	20.9%	28.2%	40.0%	9.1%	41.8%	41.8%	9.1%	41.8%	41.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	10.0	6.1	6.1	33.8	31.8	56.6	50.4	50.4	66.1	59.2	59.2
Actuated g/C Ratio	0.09	0.06	0.06	0.31	0.29	0.51	0.46	0.46	0.60	0.54	0.54
v/c Ratio	0.08	0.08	0.32	0.86	0.28	0.05	0.42	0.43	0.35	0.42	0.00
Control Delay	28.4	50.6	3.3	52.4	6.5	11.3	24.0	3.8	12.7	19.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.4	50.6	3.3	52.4	6.5	11.3	24.0	3.8	12.7	19.2	0.0
LOS	C	D	A	D	A	B	C	A	B	B	A
Approach Delay		10.1			39.2		13.2			17.1	
Approach LOS		B			D		B			B	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 21.3	Intersection LOS: C
Intersection Capacity Utilization 55.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 103: CR 5 & Flora View Dr/Soaring Heights PK-8



Intersection	
Int Delay, s/veh	4.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	19	113	199	22	171	187
Future Vol, veh/h	19	113	199	22	171	187
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	200	-	200	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	131	231	26	199	217

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	846	231	0	0	257	0
Stage 1	231	-	-	-	-	-
Stage 2	615	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	333	808	-	-	1308	-
Stage 1	807	-	-	-	-	-
Stage 2	539	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	282	808	-	-	1308	-
Mov Cap-2 Maneuver	282	-	-	-	-	-
Stage 1	807	-	-	-	-	-
Stage 2	457	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.5	0	3.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	282	808	1308	-
HCM Lane V/C Ratio	-	-	0.078	0.163	0.152	-
HCM Control Delay (s)	-	-	18.8	10.3	8.2	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.6	0.5	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	153	2	9	120	46	1	21	6	28	14	16
Future Vol, veh/h	27	153	2	9	120	46	1	21	6	28	14	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	225	-	-	175	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	93	93	93	93	92	93	92	93	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	165	2	10	129	50	1	23	6	30	15	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	179	0	0	167	0	0	414	423	166	413	399	154
Stage 1	-	-	-	-	-	-	224	224	-	174	174	-
Stage 2	-	-	-	-	-	-	190	199	-	239	225	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1397	-	-	1411	-	-	549	522	878	549	539	892
Stage 1	-	-	-	-	-	-	779	718	-	828	755	-
Stage 2	-	-	-	-	-	-	812	736	-	764	718	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1397	-	-	1411	-	-	516	507	878	515	524	892
Mov Cap-2 Maneuver	-	-	-	-	-	-	516	507	-	515	524	-
Stage 1	-	-	-	-	-	-	763	703	-	811	750	-
Stage 2	-	-	-	-	-	-	774	731	-	719	703	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0.4	11.8	11.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	516	559	1397	-	-	1411	-	-	515	672
HCM Lane V/C Ratio	0.002	0.052	0.021	-	-	0.007	-	-	0.059	0.049
HCM Control Delay (s)	12	11.8	7.6	-	-	7.6	-	-	12.4	10.6
HCM Lane LOS	B	B	A	-	-	A	-	-	B	B
HCM 95th %tile Q(veh)	0	0.2	0.1	-	-	0	-	-	0.2	0.2

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	158	8	47	161	47	4	2	27	27	1	11
Future Vol, veh/h	20	158	8	47	161	47	4	2	27	27	1	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	225	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	93	93	93	93	92	93	92	93	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	170	9	51	173	51	4	2	29	29	1	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	224	0	0	179	0	0	526	545	175	535	524	199
Stage 1	-	-	-	-	-	-	219	219	-	301	301	-
Stage 2	-	-	-	-	-	-	307	326	-	234	223	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1345	-	-	1397	-	-	462	446	868	456	458	842
Stage 1	-	-	-	-	-	-	783	722	-	708	665	-
Stage 2	-	-	-	-	-	-	703	648	-	769	719	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1345	-	-	1397	-	-	437	423	868	421	434	842
Mov Cap-2 Maneuver	-	-	-	-	-	-	437	423	-	421	434	-
Stage 1	-	-	-	-	-	-	770	710	-	697	640	-
Stage 2	-	-	-	-	-	-	667	624	-	729	707	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	1.4	10.2	13
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	733	1345	-	-	1397	-	-	491
HCM Lane V/C Ratio	0.048	0.016	-	-	0.036	-	-	0.086
HCM Control Delay (s)	10.2	7.7	-	-	7.7	-	-	13
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.3

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	30	156	12	26	10	195	251	15	4	255	34
Future Vol, veh/h	27	30	156	12	26	10	195	251	15	4	255	34
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	-	-	-	200	-	-	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	32	168	13	28	11	210	270	16	4	274	37

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1000	988	274	1099	1017	278	311	0	0	286	0	0
Stage 1	282	282	-	698	698	-	-	-	-	-	-	-
Stage 2	718	706	-	401	319	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	222	247	765	190	238	761	1249	-	-	1276	-	-
Stage 1	725	678	-	431	442	-	-	-	-	-	-	-
Stage 2	420	439	-	626	653	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	170	205	765	114	197	761	1249	-	-	1276	-	-
Mov Cap-2 Maneuver	170	205	-	114	197	-	-	-	-	-	-	-
Stage 1	603	675	-	359	368	-	-	-	-	-	-	-
Stage 2	318	365	-	464	650	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.7	30.5	3.6	0.1
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1249	-	-	170	531	192	1276	-	-
HCM Lane V/C Ratio	0.168	-	-	0.171	0.377	0.269	0.003	-	-
HCM Control Delay (s)	8.5	-	-	30.5	15.8	30.5	7.8	0	-
HCM Lane LOS	A	-	-	D	C	D	A	A	-
HCM 95th %tile Q(veh)	0.6	-	-	0.6	1.7	1	0	-	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	61	106	181	233	35
Future Vol, veh/h	20	61	106	181	233	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	300	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	93	93	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	66	115	195	251	38

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	695	270	289	0	-	0
Stage 1	270	-	-	-	-	-
Stage 2	425	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	408	769	1273	-	-	-
Stage 1	775	-	-	-	-	-
Stage 2	659	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	371	769	1273	-	-	-
Mov Cap-2 Maneuver	371	-	-	-	-	-
Stage 1	705	-	-	-	-	-
Stage 2	659	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.9	3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1273	-	608	-	-
HCM Lane V/C Ratio	0.091	-	0.145	-	-
HCM Control Delay (s)	8.1	-	11.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.5	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	21	20	134	64	21	198	539	16	9	469	26
Future Volume (vph)	21	20	134	64	21	198	539	16	9	469	26
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	47.0	47.0	10.0	47.0	47.0
Total Split (%)	11.1%	25.6%	25.6%	11.1%	25.6%	11.1%	52.2%	52.2%	11.1%	52.2%	52.2%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
Act Effct Green (s)	10.9	7.0	7.0	12.9	11.0	51.8	50.9	50.9	47.7	42.7	42.7
Actuated g/C Ratio	0.14	0.09	0.09	0.17	0.14	0.67	0.66	0.66	0.61	0.55	0.55
v/c Ratio	0.10	0.12	0.51	0.29	0.14	0.35	0.24	0.02	0.02	0.25	0.03
Control Delay	25.5	34.5	13.1	28.8	23.7	7.5	7.2	0.0	5.4	10.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.5	34.5	13.1	28.8	23.7	7.5	7.2	0.0	5.4	10.3	0.0
LOS	C	C	B	C	C	A	A	A	A	B	A
Approach Delay		17.0			27.0		7.1			9.7	
Approach LOS		B			C		A			A	

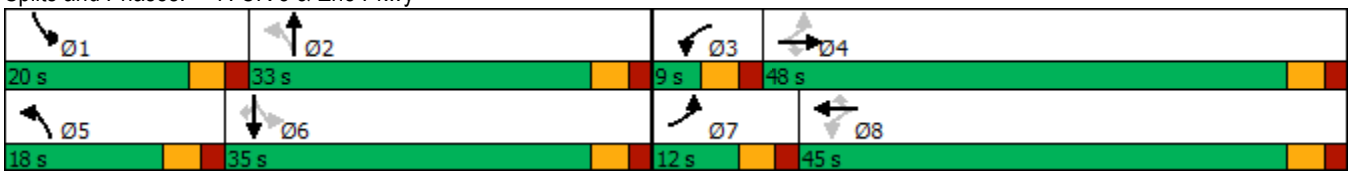
Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 77.6		
Natural Cycle: 70		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.51		
Intersection Signal Delay: 10.4	Intersection LOS: B	
Intersection Capacity Utilization 46.6%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 6: CR 5 & Colliers Pkwy/Erie HS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	219	751	359	71	531	322	304	261	278	223	164
Future Volume (vph)	219	751	359	71	531	322	304	261	278	223	164
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases	4		4	8		8	2		6		6
Detector Phase	7	4	4	3	8	8	5	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0
Total Split (s)	12.0	48.0	48.0	9.0	45.0	45.0	18.0	33.0	20.0	35.0	35.0
Total Split (%)	10.9%	43.6%	43.6%	8.2%	40.9%	40.9%	16.4%	30.0%	18.2%	31.8%	31.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	50.6	45.1	45.1	44.1	40.1	40.1	35.5	22.5	38.5	24.0	24.0
Actuated g/C Ratio	0.49	0.43	0.43	0.42	0.38	0.38	0.34	0.22	0.37	0.23	0.23
v/c Ratio	0.86	0.96	0.45	0.53	0.76	0.41	0.77	0.82	0.85	0.54	0.35
Control Delay	50.1	54.9	10.6	31.6	37.4	4.3	37.6	54.9	46.8	39.7	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.1	54.9	10.6	31.6	37.4	4.3	37.6	54.9	46.8	39.7	6.8
LOS	D	D	B	C	D	A	D	D	D	D	A
Approach Delay		42.2			25.4			46.5		34.2	
Approach LOS		D			C			D		C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 104.2	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 37.1	Intersection LOS: D
Intersection Capacity Utilization 93.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 7: CR 5 & Erie Pkwy



Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	2	51	54	2	23	88	430	50	22	388	13
Future Vol, veh/h	8	2	51	54	2	23	88	430	50	22	388	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	60	-	60	-	-	0	250	-	0	250	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	93	92	93	92	93	93	93	93	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	2	55	58	2	25	96	462	54	24	417	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1160	1173	417	1155	1133	462	431	0	0	516	0	0
Stage 1	465	465	-	654	654	-	-	-	-	-	-	-
Stage 2	695	708	-	501	479	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	172	192	636	174	203	600	1129	-	-	1050	-	-
Stage 1	578	563	-	456	463	-	-	-	-	-	-	-
Stage 2	433	438	-	552	555	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	150	172	636	145	181	600	1129	-	-	1050	-	-
Mov Cap-2 Maneuver	150	172	-	145	181	-	-	-	-	-	-	-
Stage 1	529	550	-	417	424	-	-	-	-	-	-	-
Stage 2	378	401	-	490	542	-	-	-	-	-	-	-

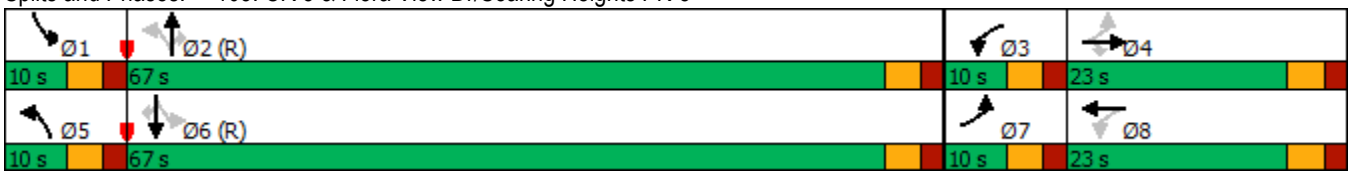
Approach	EB	WB	NB	SB
HCM Control Delay, s	14.2	35.9	1.3	0.4
HCM LOS	B	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1129	-	-	150	172	636	146	600	1050	-	-
HCM Lane V/C Ratio	0.085	-	-	0.058	0.013	0.087	0.413	0.041	0.023	-	-
HCM Control Delay (s)	8.5	-	-	30.5	26.2	11.2	46	11.3	8.5	-	-
HCM Lane LOS	A	-	-	D	D	B	E	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.2	0	0.3	1.8	0.1	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	8	2	51	54	2	88	430	50	22	388	13
Future Volume (vph)	8	2	51	54	2	88	430	50	22	388	13
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	67.0	67.0	10.0	67.0	67.0
Total Split (%)	9.1%	20.9%	20.9%	9.1%	20.9%	9.1%	60.9%	60.9%	9.1%	60.9%	60.9%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	10.0	6.1	6.1	13.0	12.1	85.9	82.3	82.3	81.9	76.0	76.0
Actuated g/C Ratio	0.09	0.06	0.06	0.12	0.11	0.78	0.75	0.75	0.74	0.69	0.69
v/c Ratio	0.06	0.02	0.28	0.37	0.14	0.14	0.33	0.04	0.03	0.32	0.01
Control Delay	40.8	48.5	3.4	48.9	20.2	3.8	7.7	0.1	3.6	8.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	48.5	3.4	48.9	20.2	3.8	7.7	0.1	3.6	8.9	0.0
LOS	D	D	A	D	C	A	A	A	A	A	A
Approach Delay		9.8			39.8		6.4			8.4	
Approach LOS		A			D		A			A	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.37	
Intersection Signal Delay: 9.7	Intersection LOS: A
Intersection Capacity Utilization 49.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 103: CR 5 & Flora View Dr/Soaring Heights PK-8



Intersection	
Int Delay, s/veh	3.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	154	203	17	71	220
Future Vol, veh/h	16	154	203	17	71	220
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	200	-	200	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	173	228	19	80	247

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	635	228	0	0	247	0
Stage 1	228	-	-	-	-	-
Stage 2	407	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	443	811	-	-	1319	-
Stage 1	810	-	-	-	-	-
Stage 2	672	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	416	811	-	-	1319	-
Mov Cap-2 Maneuver	416	-	-	-	-	-
Stage 1	810	-	-	-	-	-
Stage 2	631	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.9	0	1.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	416	811	1319	-
HCM Lane V/C Ratio	-	-	0.043	0.213	0.06	-
HCM Control Delay (s)	-	-	14	10.6	7.9	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.8	0.2	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	83	1	2	146	2	7
Future Vol, veh/h	83	1	2	146	2	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	225	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	97	1	2	170	2	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	98	0	272	98
Stage 1	-	-	-	-	98	-
Stage 2	-	-	-	-	174	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1495	-	717	958
Stage 1	-	-	-	-	926	-
Stage 2	-	-	-	-	856	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1495	-	716	958
Mov Cap-2 Maneuver	-	-	-	-	716	-
Stage 1	-	-	-	-	926	-
Stage 2	-	-	-	-	855	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	716	958	-	-	1495	-
HCM Lane V/C Ratio	0.003	0.008	-	-	0.002	-
HCM Control Delay (s)	10	8.8	-	-	7.4	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	88	1	7	144	4	20
Future Vol, veh/h	88	1	7	144	4	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	225	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	102	1	8	167	5	23

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	103	0	286	103
Stage 1	-	-	-	-	103	-
Stage 2	-	-	-	-	183	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1489	-	704	952
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	848	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1489	-	700	952
Mov Cap-2 Maneuver	-	-	-	-	700	-
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	844	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	898	-	-	1489	-
HCM Lane V/C Ratio	0.031	-	-	0.005	-
HCM Control Delay (s)	9.1	-	-	7.4	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	12	73	16	19	2	109	291	20	4	236	22
Future Vol, veh/h	23	12	73	16	19	2	109	291	20	4	236	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	225	-	-	200	-	-	225	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	13	78	17	20	2	116	310	21	4	251	23

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	823	822	251	869	835	321	274	0	0	331	0	0
Stage 1	259	259	-	553	553	-	-	-	-	-	-	-
Stage 2	564	563	-	316	282	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	292	309	788	272	304	720	1289	-	-	1228	-	-
Stage 1	746	694	-	517	514	-	-	-	-	-	-	-
Stage 2	510	509	-	695	678	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	256	280	788	220	276	720	1289	-	-	1228	-	-
Mov Cap-2 Maneuver	256	280	-	220	276	-	-	-	-	-	-	-
Stage 1	679	692	-	470	468	-	-	-	-	-	-	-
Stage 2	443	463	-	613	676	-	-	-	-	-	-	-

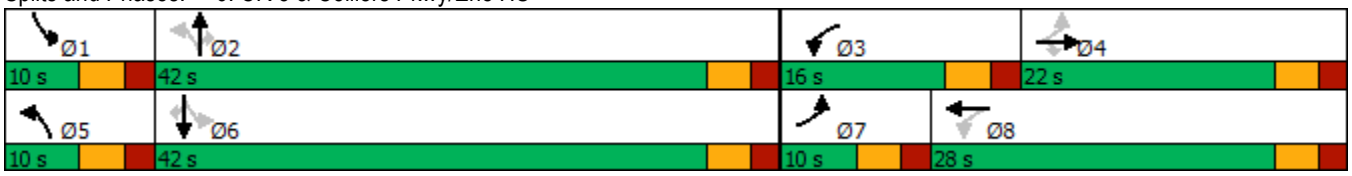
Approach	EB	WB	NB	SB
HCM Control Delay, s	13.6	20.2	2.1	0.1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1289	-	-	256	627	220	293	1228	-	-
HCM Lane V/C Ratio	0.09	-	-	0.096	0.144	0.077	0.076	0.003	-	-
HCM Control Delay (s)	8.1	-	-	20.5	11.7	22.7	18.3	7.9	-	-
HCM Lane LOS	A	-	-	C	B	C	C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.3	0.5	0.2	0.2	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	78	102	228	162	52	128	496	79	41	543	35
Future Volume (vph)	78	102	228	162	52	128	496	79	41	543	35
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	10.0	22.0	22.0	16.0	28.0	10.0	42.0	42.0	10.0	42.0	42.0
Total Split (%)	11.1%	24.4%	24.4%	17.8%	31.1%	11.1%	46.7%	46.7%	11.1%	46.7%	46.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
Act Effct Green (s)	19.0	14.0	14.0	30.0	22.1	43.1	39.2	39.2	42.1	37.1	37.1
Actuated g/C Ratio	0.22	0.16	0.16	0.34	0.25	0.49	0.45	0.45	0.48	0.43	0.43
v/c Ratio	0.28	0.68	0.53	0.91	0.35	0.34	0.33	0.19	0.19	0.38	0.05
Control Delay	22.9	46.6	9.1	54.8	24.6	13.6	17.4	1.6	11.7	18.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.9	46.6	9.1	54.8	24.6	13.6	17.4	1.6	11.7	18.5	0.1
LOS	C	D	A	D	C	B	B	A	B	B	A
Approach Delay		25.7			44.6		13.7			16.8	
Approach LOS		C			D		B			B	

Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 87.1		
Natural Cycle: 70		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.91		
Intersection Signal Delay: 23.0	Intersection LOS: C	
Intersection Capacity Utilization 50.6%	ICU Level of Service A	
Analysis Period (min) 15		

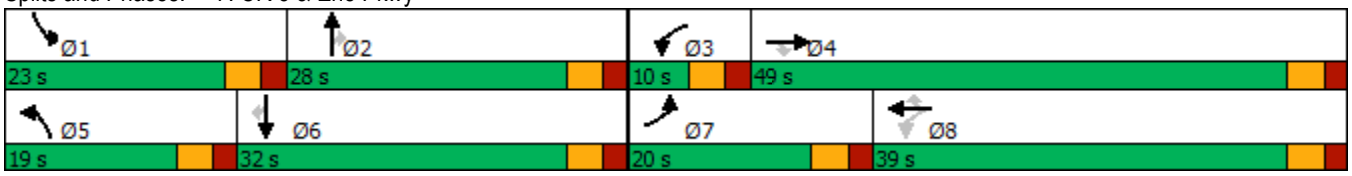
Splits and Phases: 6: CR 5 & Colliers Pkwy/Erie HS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	319	630	162	65	685	390	301	244	76	375	242	313
Future Volume (vph)	319	630	162	65	685	390	301	244	76	375	242	313
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8		8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	20.0	49.0	49.0	10.0	39.0	39.0	19.0	28.0	28.0	23.0	32.0	32.0
Total Split (%)	18.2%	44.5%	44.5%	9.1%	35.5%	35.5%	17.3%	25.5%	25.5%	20.9%	29.1%	29.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	13.5	45.5	45.5	39.8	34.8	34.8	12.9	13.1	13.1	15.5	15.7	15.7
Actuated g/C Ratio	0.14	0.47	0.47	0.41	0.36	0.36	0.13	0.14	0.14	0.16	0.16	0.16
v/c Ratio	0.70	0.40	0.20	0.19	0.56	0.49	0.69	0.53	0.22	0.71	0.44	0.73
Control Delay	49.1	19.3	3.7	14.4	28.5	5.0	49.7	43.6	1.4	47.3	39.0	22.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.1	19.3	3.7	14.4	28.5	5.0	49.7	43.6	1.4	47.3	39.0	22.8
LOS	D	B	A	B	C	A	D	D	A	D	D	C
Approach Delay		25.6			19.6			41.4			36.9	
Approach LOS		C			B			D			D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 97	
Natural Cycle: 70	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 29.2	Intersection LOS: C
Intersection Capacity Utilization 62.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 7: CR 5 & Erie Pkwy



Intersection	
Int Delay, s/veh	292.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	28	136	202	10	73	43	330	206	70	248	6
Future Vol, veh/h	19	28	136	202	10	73	43	330	206	70	248	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	60	-	60	-	-	0	250	-	0	250	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	50	50	50	94	94	50	50	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	30	145	404	20	146	46	351	412	140	264	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1276	1399	264	1078	993	351	270	0	0	763	0	0
Stage 1	544	544	-	443	443	-	-	-	-	-	-	-
Stage 2	732	855	-	635	550	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	144	141	775	~ 196	245	692	1293	-	-	850	-	-
Stage 1	523	519	-	594	576	-	-	-	-	-	-	-
Stage 2	413	375	-	467	516	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	89	114	775	~ 109	197	692	1293	-	-	850	-	-
Mov Cap-2 Maneuver	89	114	-	~ 109	197	-	-	-	-	-	-	-
Stage 1	504	433	-	573	555	-	-	-	-	-	-	-
Stage 2	303	362	-	~ 295	431	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.1	$ 1006.4	0.4	3.4
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1293	-	-	89	114	775	111	692	850	-	-
HCM Lane V/C Ratio	0.035	-	-	0.227	0.261	0.187	3.82	0.211	0.165	-	-
HCM Control Delay (s)	7.9	-	-	57	47.4	10.9	$ 1348.9	11.6	10.1	-	-
HCM Lane LOS	A	-	-	F	E	B	F	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.8	1	0.7	42.8	0.8	0.6	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	3.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	18	104	245	17	152	234
Future Vol, veh/h	18	104	245	17	152	234
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	200	-	200	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	121	285	20	177	272

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	911	285	0	0	305	0
Stage 1	285	-	-	-	-	-
Stage 2	626	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	304	754	-	-	1256	-
Stage 1	763	-	-	-	-	-
Stage 2	533	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	261	754	-	-	1256	-
Mov Cap-2 Maneuver	261	-	-	-	-	-
Stage 1	763	-	-	-	-	-
Stage 2	458	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.1	0	3.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	261	754	1256	-
HCM Lane V/C Ratio	-	-	0.08	0.16	0.141	-
HCM Control Delay (s)	-	-	20	10.7	8.3	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.6	0.5	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	139	2	9	108	1	5
Future Vol, veh/h	139	2	9	108	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	225	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	149	2	10	116	1	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	151	0	286	150
Stage 1	-	-	-	-	150	-
Stage 2	-	-	-	-	136	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1430	-	704	896
Stage 1	-	-	-	-	878	-
Stage 2	-	-	-	-	890	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1430	-	699	896
Mov Cap-2 Maneuver	-	-	-	-	699	-
Stage 1	-	-	-	-	878	-
Stage 2	-	-	-	-	884	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	699	896	-	-	1430	-
HCM Lane V/C Ratio	0.002	0.006	-	-	0.007	-
HCM Control Delay (s)	10.2	9	-	-	7.5	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	138	6	26	114	3	15
Future Vol, veh/h	138	6	26	114	3	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	225	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	148	6	28	123	3	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	154	0	330	151
Stage 1	-	-	-	-	151	-
Stage 2	-	-	-	-	179	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1426	-	665	895
Stage 1	-	-	-	-	877	-
Stage 2	-	-	-	-	852	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1426	-	652	895
Mov Cap-2 Maneuver	-	-	-	-	652	-
Stage 1	-	-	-	-	877	-
Stage 2	-	-	-	-	835	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	843	-	-	1426	-
HCM Lane V/C Ratio	0.023	-	-	0.02	-
HCM Control Delay (s)	9.4	-	-	7.6	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	26	100	21	16	7	90	194	22	2	254	33
Future Vol, veh/h	27	26	100	21	16	7	90	194	22	2	254	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	225	-	-	200	-	-	225	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	28	108	23	17	8	97	209	24	2	273	35

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	705	704	273	778	727	221	308	0	0	233	0	0
Stage 1	277	277	-	415	415	-	-	-	-	-	-	-
Stage 2	428	427	-	363	312	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	351	361	766	314	351	819	1253	-	-	1335	-	-
Stage 1	729	681	-	615	592	-	-	-	-	-	-	-
Stage 2	605	585	-	656	658	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	314	333	766	238	324	819	1253	-	-	1335	-	-
Mov Cap-2 Maneuver	314	333	-	238	324	-	-	-	-	-	-	-
Stage 1	673	680	-	568	546	-	-	-	-	-	-	-
Stage 2	536	540	-	540	657	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.6	18	2.4	0.1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1253	-	-	314	604	238	397	1335	-	-
HCM Lane V/C Ratio	0.077	-	-	0.092	0.224	0.095	0.062	0.002	-	-
HCM Control Delay (s)	8.1	-	-	17.6	12.7	21.7	14.7	7.7	-	-
HCM Lane LOS	A	-	-	C	B	C	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.3	0.9	0.3	0.2	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	32	21	160	64	23	266	446	16	9	450	35
Future Volume (vph)	32	21	160	64	23	266	446	16	9	450	35
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	47.0	47.0	10.0	47.0	47.0
Total Split (%)	11.1%	25.6%	25.6%	11.1%	25.6%	11.1%	52.2%	52.2%	11.1%	52.2%	52.2%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
Act Effct Green (s)	11.1	7.3	7.3	13.1	11.2	51.3	50.4	50.4	47.2	42.2	42.2
Actuated g/C Ratio	0.14	0.09	0.09	0.17	0.14	0.66	0.65	0.65	0.61	0.55	0.55
v/c Ratio	0.15	0.13	0.56	0.29	0.14	0.46	0.20	0.02	0.01	0.24	0.04
Control Delay	26.1	34.2	13.7	28.5	23.9	9.4	7.1	0.0	5.7	10.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	34.2	13.7	28.5	23.9	9.4	7.1	0.0	5.7	10.4	0.1
LOS	C	C	B	C	C	A	A	A	A	B	A
Approach Delay		17.5			26.8		7.8			9.6	
Approach LOS		B			C		A			A	

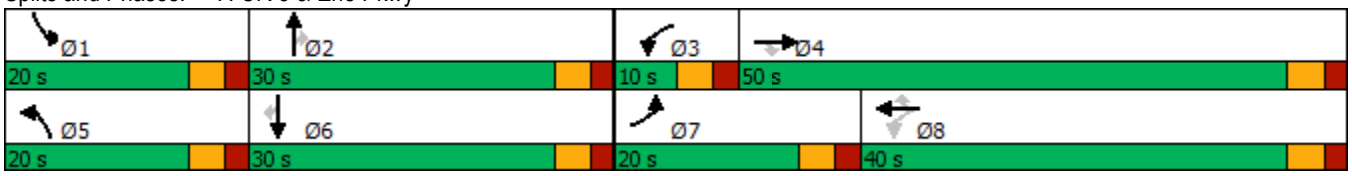
Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 77.3	
Natural Cycle: 70	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.56	
Intersection Signal Delay: 11.0	Intersection LOS: B
Intersection Capacity Utilization 49.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: CR 5 & Colliers Pkwy/Erie HS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	212	868	389	88	614	302	329	264	76	276	235	163
Future Volume (vph)	212	868	389	88	614	302	329	264	76	276	235	163
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8		8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	20.0	50.0	50.0	10.0	40.0	40.0	20.0	30.0	30.0	20.0	30.0	30.0
Total Split (%)	18.2%	45.5%	45.5%	9.1%	36.4%	36.4%	18.2%	27.3%	27.3%	18.2%	27.3%	27.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	11.3	46.0	46.0	42.4	37.4	37.4	13.5	13.0	13.0	12.7	12.1	12.1
Actuated g/C Ratio	0.12	0.49	0.49	0.45	0.40	0.40	0.14	0.14	0.14	0.13	0.13	0.13
v/c Ratio	0.53	0.52	0.41	0.31	0.45	0.38	0.69	0.56	0.22	0.62	0.53	0.50
Control Delay	44.7	19.3	3.2	14.1	23.4	4.2	47.1	43.4	1.4	45.5	43.5	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.7	19.3	3.2	14.1	23.4	4.2	47.1	43.4	1.4	45.5	43.5	11.1
LOS	D	B	A	B	C	A	D	D	A	D	D	B
Approach Delay		18.7			16.8			40.5			36.2	
Approach LOS		B			B			D			D	

Intersection Summary		
Cycle Length: 110		
Actuated Cycle Length: 94.5		
Natural Cycle: 70		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.69		
Intersection Signal Delay: 25.1	Intersection LOS: C	
Intersection Capacity Utilization 61.4%	ICU Level of Service B	
Analysis Period (min) 15		

Splits and Phases: 7: CR 5 & Erie Pkwy



Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	6	94	54	7	19	161	275	51	17	335	24
Future Vol, veh/h	14	6	94	54	7	19	161	275	51	17	335	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	60	-	60	-	-	0	250	-	0	250	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	6	101	58	8	20	173	296	55	18	360	26

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1080	1093	360	1105	1064	296	386	0	0	351	0	0
Stage 1	396	396	-	642	642	-	-	-	-	-	-	-
Stage 2	684	697	-	463	422	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	196	214	684	188	223	743	1172	-	-	1208	-	-
Stage 1	629	604	-	463	469	-	-	-	-	-	-	-
Stage 2	439	443	-	579	588	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	162	180	684	137	187	743	1172	-	-	1208	-	-
Mov Cap-2 Maneuver	162	180	-	137	187	-	-	-	-	-	-	-
Stage 1	536	595	-	394	400	-	-	-	-	-	-	-
Stage 2	357	377	-	481	579	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.2	41.3	2.8	0.4
HCM LOS	B	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1172	-	-	162	180	684	141	743	1208	-	-
HCM Lane V/C Ratio	0.148	-	-	0.093	0.036	0.148	0.465	0.027	0.015	-	-
HCM Control Delay (s)	8.6	-	-	29.5	25.7	11.2	51	10	8	-	-
HCM Lane LOS	A	-	-	D	D	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.5	-	-	0.3	0.1	0.5	2.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	4.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	185	203	18	81	220
Future Vol, veh/h	20	185	203	18	81	220
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	200	-	200	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	208	228	20	91	247

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	657	228	0	0	248	0
Stage 1	228	-	-	-	-	-
Stage 2	429	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	430	811	-	-	1318	-
Stage 1	810	-	-	-	-	-
Stage 2	657	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	400	811	-	-	1318	-
Mov Cap-2 Maneuver	400	-	-	-	-	-
Stage 1	810	-	-	-	-	-
Stage 2	612	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	2.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	400	811	1318	-
HCM Lane V/C Ratio	-	-	0.056	0.256	0.069	-
HCM Control Delay (s)	-	-	14.5	11	7.9	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	1	0.2	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	88	1	2	161	14	2	12	7	41	31	20
Future Vol, veh/h	6	88	1	2	161	14	2	12	7	41	31	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	225	-	-	175	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	86	86	86	86	92	86	92	86	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	102	1	2	187	15	2	13	8	45	34	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	202	0	0	103	0	0	344	323	103	326	316	195
Stage 1	-	-	-	-	-	-	117	117	-	199	199	-
Stage 2	-	-	-	-	-	-	227	206	-	127	117	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1370	-	-	1489	-	-	610	595	952	627	600	846
Stage 1	-	-	-	-	-	-	888	799	-	803	736	-
Stage 2	-	-	-	-	-	-	776	731	-	877	799	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1370	-	-	1489	-	-	566	591	952	608	596	846
Mov Cap-2 Maneuver	-	-	-	-	-	-	566	591	-	608	596	-
Stage 1	-	-	-	-	-	-	884	795	-	799	735	-
Stage 2	-	-	-	-	-	-	720	730	-	851	795	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.1	10.5	11.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	566	692	1370	-	-	1489	-	-	608	674
HCM Lane V/C Ratio	0.004	0.031	0.005	-	-	0.002	-	-	0.073	0.082
HCM Control Delay (s)	11.4	10.4	7.6	-	-	7.4	-	-	11.4	10.8
HCM Lane LOS	B	B	A	-	-	A	-	-	B	B
HCM 95th %tile Q(veh)	0	0.1	0	-	-	0	-	-	0.2	0.3

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	129	1	7	158	12	4	2	20	40	5	15
Future Vol, veh/h	5	129	1	7	158	12	4	2	20	40	5	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	225	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	86	86	86	86	92	86	92	86	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	150	1	8	184	13	5	2	23	43	5	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	197	0	0	151	0	0	378	374	151	380	368	191
Stage 1	-	-	-	-	-	-	161	161	-	207	207	-
Stage 2	-	-	-	-	-	-	217	213	-	173	161	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1376	-	-	1430	-	-	580	557	895	578	561	851
Stage 1	-	-	-	-	-	-	841	765	-	795	731	-
Stage 2	-	-	-	-	-	-	785	726	-	829	765	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1376	-	-	1430	-	-	561	551	895	557	555	851
Mov Cap-2 Maneuver	-	-	-	-	-	-	561	551	-	557	555	-
Stage 1	-	-	-	-	-	-	838	762	-	792	727	-
Stage 2	-	-	-	-	-	-	760	722	-	802	762	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.3	9.8	11.6
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	787	1376	-	-	1430	-	-	609
HCM Lane V/C Ratio	0.038	0.004	-	-	0.006	-	-	0.107
HCM Control Delay (s)	9.8	7.6	-	-	7.5	-	-	11.6
HCM Lane LOS	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.4

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	20	144	16	22	3	132	321	20	7	325	23
Future Vol, veh/h	25	20	144	16	22	3	132	321	20	7	325	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	225	-	-	200	-	-	225	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	21	153	17	23	3	140	341	21	7	346	24

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1005	1002	346	1091	1016	352	370	0	0	362	0	0
Stage 1	360	360	-	632	632	-	-	-	-	-	-	-
Stage 2	645	642	-	459	384	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	220	242	697	192	238	692	1189	-	-	1197	-	-
Stage 1	658	626	-	468	474	-	-	-	-	-	-	-
Stage 2	461	469	-	582	611	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	182	212	697	126	209	692	1189	-	-	1197	-	-
Mov Cap-2 Maneuver	182	212	-	126	209	-	-	-	-	-	-	-
Stage 1	580	622	-	413	418	-	-	-	-	-	-	-
Stage 2	382	414	-	436	607	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.5	28.8	2.4	0.2
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1189	-	-	182	545	126	228	1197	-	-
HCM Lane V/C Ratio	0.118	-	-	0.146	0.32	0.135	0.117	0.006	-	-
HCM Control Delay (s)	8.4	-	-	28.1	14.7	38	22.9	8	-	-
HCM Lane LOS	A	-	-	D	B	E	C	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	0.5	1.4	0.5	0.4	0	-	-

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	25	20	16	22	132	321	7	325	23
Future Volume (vph)	25	20	16	22	132	321	7	325	23
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	25.0	25.0	25.0	25.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	22.7%	22.7%	22.7%	22.7%	77.3%	77.3%	77.3%	77.3%	77.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	8.7	8.7	8.7	8.7	91.3	91.3	91.3	91.3	91.3
Actuated g/C Ratio	0.08	0.08	0.08	0.08	0.83	0.83	0.83	0.83	0.83
v/c Ratio	0.25	0.65	0.25	0.18	0.16	0.24	0.01	0.22	0.02
Control Delay	51.5	22.2	54.9	44.2	1.5	1.4	2.3	2.6	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.5	22.2	54.9	44.2	1.5	1.4	2.3	2.6	1.0
LOS	D	C	D	D	A	A	A	A	A
Approach Delay		26.2		48.5		1.4		2.5	
Approach LOS		C		D		A		A	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 8.0	Intersection LOS: A
Intersection Capacity Utilization 50.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 4: CR 5 & CR 10

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	26	92	31	319	262	8
Future Vol, veh/h	26	92	31	319	262	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	300	-	-	235
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	86	86	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	100	34	371	305	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	744	305	314	0	-	0
Stage 1	305	-	-	-	-	-
Stage 2	439	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	382	735	1246	-	-	-
Stage 1	748	-	-	-	-	-
Stage 2	650	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	372	735	1246	-	-	-
Mov Cap-2 Maneuver	372	-	-	-	-	-
Stage 1	728	-	-	-	-	-
Stage 2	650	-	-	-	-	-

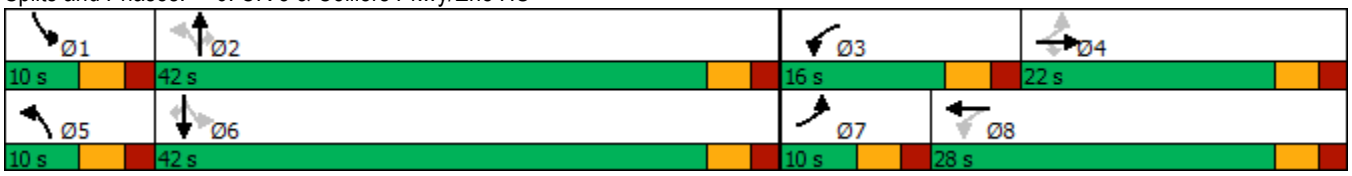
Approach	EB	NB	SB
HCM Control Delay, s	12.5	0.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1246	-	605	-	-
HCM Lane V/C Ratio	0.027	-	0.212	-	-
HCM Control Delay (s)	8	-	12.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.8	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	78	102	228	162	52	128	540	79	51	677	35
Future Volume (vph)	78	102	228	162	52	128	540	79	51	677	35
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	10.0	22.0	22.0	16.0	28.0	10.0	42.0	42.0	10.0	42.0	42.0
Total Split (%)	11.1%	24.4%	24.4%	17.8%	31.1%	11.1%	46.7%	46.7%	11.1%	46.7%	46.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
Act Effct Green (s)	19.0	14.0	14.0	30.0	22.1	43.1	39.2	39.2	42.1	37.1	37.1
Actuated g/C Ratio	0.22	0.16	0.16	0.34	0.25	0.49	0.45	0.45	0.48	0.43	0.43
v/c Ratio	0.28	0.68	0.56	0.91	0.36	0.41	0.36	0.19	0.25	0.48	0.05
Control Delay	23.0	46.6	12.3	54.8	24.5	15.1	17.7	1.6	12.2	19.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.0	46.6	12.3	54.8	24.5	15.1	17.7	1.6	12.2	19.8	0.1
LOS	C	D	B	D	C	B	B	A	B	B	A
Approach Delay		27.2			44.4		14.4			18.0	
Approach LOS		C			D		B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 87.1	
Natural Cycle: 70	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 23.4	Intersection LOS: C
Intersection Capacity Utilization 54.3%	ICU Level of Service A
Analysis Period (min) 15	

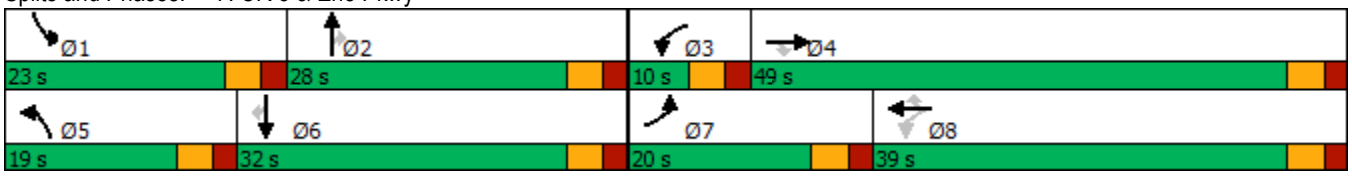
Splits and Phases: 6: CR 5 & Colliers Pkwy/Erie HS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	333	630	162	65	685	408	301	254	76	431	273	358
Future Volume (vph)	333	630	162	65	685	408	301	254	76	431	273	358
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8		8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	20.0	49.0	49.0	10.0	39.0	39.0	19.0	28.0	28.0	23.0	32.0	32.0
Total Split (%)	18.2%	44.5%	44.5%	9.1%	35.5%	35.5%	17.3%	25.5%	25.5%	20.9%	29.1%	29.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	13.8	45.6	45.6	39.5	34.5	34.5	12.9	14.7	14.7	16.6	18.4	18.4
Actuated g/C Ratio	0.14	0.46	0.46	0.40	0.35	0.35	0.13	0.15	0.15	0.17	0.18	0.18
v/c Ratio	0.73	0.41	0.21	0.20	0.58	0.52	0.71	0.51	0.21	0.78	0.44	0.78
Control Delay	51.9	20.7	3.9	15.6	30.4	5.2	52.1	42.8	1.3	51.5	38.2	27.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.9	20.7	3.9	15.6	30.4	5.2	52.1	42.8	1.3	51.5	38.2	27.5
LOS	D	C	A	B	C	A	D	D	A	D	D	C
Approach Delay		27.5			20.7			42.2			40.0	
Approach LOS		C			C			D			D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 99.8	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 31.2	Intersection LOS: C
Intersection Capacity Utilization 64.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: CR 5 & Erie Pkwy



Intersection	
Int Delay, s/veh	547.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	28	136	202	10	78	43	378	206	84	394	6
Future Vol, veh/h	19	28	136	202	10	78	43	378	206	84	394	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	60	-	60	-	-	0	250	-	0	250	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	50	94	50	94	94	50	50	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	30	145	404	11	156	46	402	412	168	419	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1539	1661	419	1340	1255	402	425	0	0	814	0	0
Stage 1	755	755	-	494	494	-	-	-	-	-	-	-
Stage 2	784	906	-	846	761	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	94	97	634	~ 130	172	648	1134	-	-	813	-	-
Stage 1	401	417	-	557	546	-	-	-	-	-	-	-
Stage 2	386	355	-	~ 357	414	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	55	74	634	~ 57	131	648	1134	-	-	813	-	-
Mov Cap-2 Maneuver	55	74	-	~ 57	131	-	-	-	-	-	-	-
Stage 1	385	331	-	534	524	-	-	-	-	-	-	-
Stage 2	275	340	-	~ 199	328	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	32.7	$ 2113.8	0.4	3
HCM LOS	D	F		

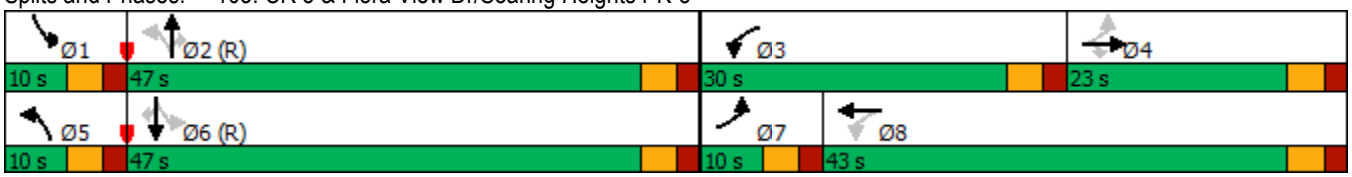
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1134	-	-	55	74	634	58	648	813	-	-
HCM Lane V/C Ratio	0.04	-	-	0.368	0.403	0.228	7.149	0.241	0.207	-	-
HCM Control Delay (s)	8.3	-	-	104.4	83.2	12.3	$ 2904.5	12.3	10.6	-	-
HCM Lane LOS	A	-	-	F	F	B	F	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	1.3	1.6	0.9	47.8	0.9	0.8	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	19	28	136	202	10	43	378	206	84	394	6
Future Volume (vph)	19	28	136	202	10	43	378	206	84	394	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	10.0	23.0	23.0	30.0	43.0	10.0	47.0	47.0	10.0	47.0	47.0
Total Split (%)	9.1%	20.9%	20.9%	27.3%	39.1%	9.1%	42.7%	42.7%	9.1%	42.7%	42.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	12.5	7.5	7.5	36.3	32.3	55.3	48.5	48.5	62.8	54.0	54.0
Actuated g/C Ratio	0.11	0.07	0.07	0.33	0.29	0.50	0.44	0.44	0.57	0.49	0.49
v/c Ratio	0.12	0.24	0.55	0.83	0.29	0.10	0.49	0.44	0.36	0.46	0.01
Control Delay	28.0	52.2	12.9	47.0	7.4	12.0	25.8	3.9	12.6	19.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.0	52.2	12.9	47.0	7.4	12.0	25.8	3.9	12.6	19.8	0.0
LOS	C	D	B	D	A	B	C	A	B	B	A
Approach Delay		20.5			35.5		14.6			17.5	
Approach LOS		C			D		B			B	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 21.3	Intersection LOS: C
Intersection Capacity Utilization 55.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 103: CR 5 & Flora View Dr/Soaring Heights PK-8



Intersection	
Int Delay, s/veh	4.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	127	245	23	193	234
Future Vol, veh/h	21	127	245	23	193	234
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	200	-	200	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	148	285	27	224	272

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1005	285	0	0	312	0
Stage 1	285	-	-	-	-	-
Stage 2	720	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	268	754	-	-	1248	-
Stage 1	763	-	-	-	-	-
Stage 2	482	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	220	754	-	-	1248	-
Mov Cap-2 Maneuver	220	-	-	-	-	-
Stage 1	763	-	-	-	-	-
Stage 2	396	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.7	0	3.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	220	754	1248	-
HCM Lane V/C Ratio	-	-	0.111	0.196	0.18	-
HCM Control Delay (s)	-	-	23.4	10.9	8.5	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0.7	0.7	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	159	2	9	119	46	1	21	5	28	14	16
Future Vol, veh/h	27	159	2	9	119	46	1	21	5	28	14	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	225	-	-	175	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	93	93	93	93	92	93	92	93	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	171	2	10	128	50	1	23	5	30	15	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	178	0	0	173	0	0	419	428	172	417	404	153
Stage 1	-	-	-	-	-	-	230	230	-	173	173	-
Stage 2	-	-	-	-	-	-	189	198	-	244	231	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1398	-	-	1404	-	-	544	519	872	546	536	893
Stage 1	-	-	-	-	-	-	773	714	-	829	756	-
Stage 2	-	-	-	-	-	-	813	737	-	760	713	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1398	-	-	1404	-	-	510	504	872	513	521	893
Mov Cap-2 Maneuver	-	-	-	-	-	-	510	504	-	513	521	-
Stage 1	-	-	-	-	-	-	757	699	-	812	751	-
Stage 2	-	-	-	-	-	-	775	732	-	715	698	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0.4	11.9	11.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	510	548	1398	-	-	1404	-	-	513	670
HCM Lane V/C Ratio	0.002	0.051	0.021	-	-	0.007	-	-	0.059	0.049
HCM Control Delay (s)	12.1	11.9	7.6	-	-	7.6	-	-	12.5	10.6
HCM Lane LOS	B	B	A	-	-	A	-	-	B	B
HCM 95th %tile Q(veh)	0	0.2	0.1	-	-	0	-	-	0.2	0.2

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	166	6	26	160	47	3	2	15	27	1	11
Future Vol, veh/h	20	166	6	26	160	47	3	2	15	27	1	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	225	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	93	93	93	93	92	93	92	93	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	178	6	28	172	51	3	2	16	29	1	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	223	0	0	184	0	0	485	504	181	488	482	198
Stage 1	-	-	-	-	-	-	225	225	-	254	254	-
Stage 2	-	-	-	-	-	-	260	279	-	234	228	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1346	-	-	1391	-	-	492	470	862	490	484	843
Stage 1	-	-	-	-	-	-	778	718	-	750	697	-
Stage 2	-	-	-	-	-	-	745	680	-	769	715	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1346	-	-	1391	-	-	471	453	862	466	467	843
Mov Cap-2 Maneuver	-	-	-	-	-	-	471	453	-	466	467	-
Stage 1	-	-	-	-	-	-	766	707	-	738	683	-
Stage 2	-	-	-	-	-	-	719	666	-	740	704	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0.9	10.2	12.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	709	1346	-	-	1391	-	-	533
HCM Lane V/C Ratio	0.03	0.016	-	-	0.02	-	-	0.08
HCM Control Delay (s)	10.2	7.7	-	-	7.6	-	-	12.3
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.3

Intersection	
Int Delay, s/veh	6.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	32	148	21	26	11	171	296	22	4	313	36
Future Vol, veh/h	28	32	148	21	26	11	171	296	22	4	313	36
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	225	-	-	200	-	-	225	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	34	156	22	27	12	180	312	23	4	329	38

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1040	1032	329	1135	1059	324	367	0	0	335	0	0
Stage 1	337	337	-	684	684	-	-	-	-	-	-	-
Stage 2	703	695	-	451	375	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	208	233	712	179	224	717	1192	-	-	1224	-	-
Stage 1	677	641	-	439	449	-	-	-	-	-	-	-
Stage 2	428	444	-	588	617	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	161	197	712	108	190	717	1192	-	-	1224	-	-
Mov Cap-2 Maneuver	161	197	-	108	190	-	-	-	-	-	-	-
Stage 1	575	639	-	373	381	-	-	-	-	-	-	-
Stage 2	332	377	-	434	615	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.1	31.3	3	0.1
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1192	-	-	161	486	108	243	1224	-	-
HCM Lane V/C Ratio	0.151	-	-	0.183	0.39	0.205	0.16	0.003	-	-
HCM Control Delay (s)	8.6	-	-	32.3	17.1	46.7	22.6	8	-	-
HCM Lane LOS	A	-	-	D	C	E	C	A	-	-
HCM 95th %tile Q(veh)	0.5	-	-	0.6	1.8	0.7	0.6	0	-	-

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	28	32	21	26	171	296	4	313	36
Future Volume (vph)	28	32	21	26	171	296	4	313	36
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	25.0	25.0	25.0	25.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	22.7%	22.7%	22.7%	22.7%	77.3%	77.3%	77.3%	77.3%	77.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	9.4	9.4	9.4	9.4	90.6	90.6	90.6	90.6	90.6
Actuated g/C Ratio	0.09	0.09	0.09	0.09	0.82	0.82	0.82	0.82	0.82
v/c Ratio	0.26	0.68	0.34	0.25	0.21	0.23	0.00	0.22	0.03
Control Delay	50.6	24.1	59.2	37.9	2.7	2.4	2.5	2.8	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.6	24.1	59.2	37.9	2.7	2.4	2.5	2.8	0.9
LOS	D	C	E	D	A	A	A	A	A
Approach Delay		27.6		45.7		2.5		2.6	
Approach LOS		C		D		A		A	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 9.5	Intersection LOS: A
Intersection Capacity Utilization 55.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: CR 5 & CR 10

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	61	106	229	293	35
Future Vol, veh/h	20	61	106	229	293	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	300	-	-	235
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	93	93	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	66	115	246	315	38

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	791	315	353	0	-	0
Stage 1	315	-	-	-	-	-
Stage 2	476	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	358	725	1206	-	-	-
Stage 1	740	-	-	-	-	-
Stage 2	625	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	324	725	1206	-	-	-
Mov Cap-2 Maneuver	324	-	-	-	-	-
Stage 1	670	-	-	-	-	-
Stage 2	625	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	2.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1206	-	555	-	-
HCM Lane V/C Ratio	0.096	-	0.159	-	-
HCM Control Delay (s)	8.3	-	12.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.6	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	32	21	160	64	23	266	623	16	11	551	35
Future Volume (vph)	32	21	160	64	23	266	623	16	11	551	35
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	47.0	47.0	10.0	47.0	47.0
Total Split (%)	11.1%	25.6%	25.6%	11.1%	25.6%	11.1%	52.2%	52.2%	11.1%	52.2%	52.2%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
Act Effct Green (s)	11.1	7.3	7.3	13.1	11.2	51.3	50.4	50.4	47.2	42.2	42.2
Actuated g/C Ratio	0.14	0.09	0.09	0.17	0.14	0.66	0.65	0.65	0.61	0.55	0.55
v/c Ratio	0.15	0.13	0.56	0.29	0.15	0.52	0.28	0.02	0.02	0.30	0.04
Control Delay	26.1	34.2	13.7	28.5	23.6	10.7	7.6	0.0	5.6	10.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	34.2	13.7	28.5	23.6	10.7	7.6	0.0	5.6	10.8	0.1
LOS	C	C	B	C	C	B	A	A	A	B	A
Approach Delay		17.5			26.7		8.4			10.1	
Approach LOS		B			C		A			B	

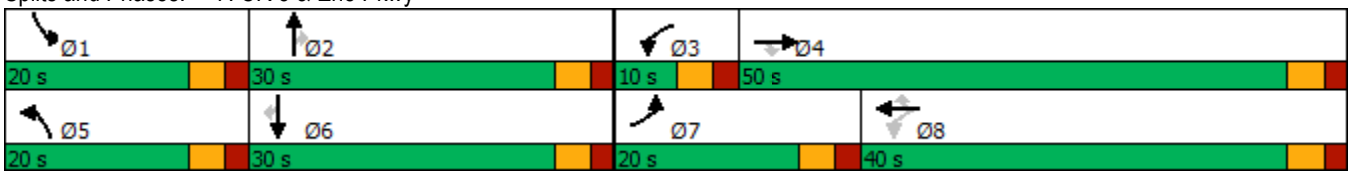
Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 77.3		
Natural Cycle: 70		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.56		
Intersection Signal Delay: 11.0	Intersection LOS: B	
Intersection Capacity Utilization 52.7%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 6: CR 5 & Colliers Pkwy/Erie HS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	272	868	389	88	614	377	329	305	76	319	258	197
Future Volume (vph)	272	868	389	88	614	377	329	305	76	319	258	197
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8		8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	20.0	50.0	50.0	10.0	40.0	40.0	20.0	30.0	30.0	20.0	30.0	30.0
Total Split (%)	18.2%	45.5%	45.5%	9.1%	36.4%	36.4%	18.2%	27.3%	27.3%	18.2%	27.3%	27.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	12.7	46.2	46.2	41.3	36.3	36.3	13.6	14.0	14.0	13.5	13.8	13.8
Actuated g/C Ratio	0.13	0.48	0.48	0.43	0.38	0.38	0.14	0.15	0.15	0.14	0.14	0.14
v/c Ratio	0.62	0.53	0.42	0.32	0.48	0.46	0.70	0.61	0.21	0.69	0.53	0.52
Control Delay	46.8	20.4	3.3	15.2	25.5	4.6	48.6	44.5	1.3	48.3	42.6	10.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.8	20.4	3.3	15.2	25.5	4.6	48.6	44.5	1.3	48.3	42.6	10.3
LOS	D	C	A	B	C	A	D	D	A	D	D	B
Approach Delay		20.7			17.4			41.8			36.4	
Approach LOS		C			B			D			D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 96.5	
Natural Cycle: 70	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 26.5	Intersection LOS: C
Intersection Capacity Utilization 63.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 7: CR 5 & Erie Pkwy



Intersection	
Int Delay, s/veh	9.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	6	94	54	7	22	161	454	51	20	438	24
Future Vol, veh/h	14	6	94	54	7	22	161	454	51	20	438	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	60	-	60	-	-	0	250	-	0	250	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	93	92	93	92	93	93	93	93	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	7	102	58	8	24	175	488	55	22	471	26

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1397	1408	471	1421	1379	488	497	0	0	543	0	0
Stage 1	515	515	-	838	838	-	-	-	-	-	-	-
Stage 2	882	893	-	583	541	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	118	139	593	114	144	580	1067	-	-	1026	-	-
Stage 1	543	535	-	361	382	-	-	-	-	-	-	-
Stage 2	341	360	-	498	521	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	93	114	593	78	118	580	1067	-	-	1026	-	-
Mov Cap-2 Maneuver	93	114	-	78	118	-	-	-	-	-	-	-
Stage 1	454	524	-	302	319	-	-	-	-	-	-	-
Stage 2	267	301	-	398	510	-	-	-	-	-	-	-

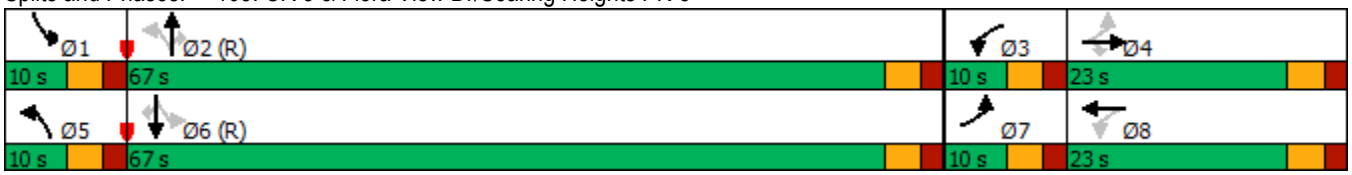
Approach	EB	WB	NB	SB
HCM Control Delay, s	18.4	106.8	2.2	0.4
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1067	-	-	93	114	593	81	580	1026	-	-
HCM Lane V/C Ratio	0.164	-	-	0.164	0.057	0.172	0.811	0.041	0.021	-	-
HCM Control Delay (s)	9	-	-	51.1	38.5	12.3	141.1	11.5	8.6	-	-
HCM Lane LOS	A	-	-	F	E	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.6	-	-	0.6	0.2	0.6	4.1	0.1	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	14	6	94	54	7	161	454	51	20	438	24
Future Volume (vph)	14	6	94	54	7	161	454	51	20	438	24
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases	4		4	8		2		2	6		6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	67.0	67.0	10.0	67.0	67.0
Total Split (%)	9.1%	20.9%	20.9%	9.1%	20.9%	9.1%	60.9%	60.9%	9.1%	60.9%	60.9%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	10.7	6.7	6.7	12.7	10.7	84.8	80.8	80.8	77.7	71.9	71.9
Actuated g/C Ratio	0.10	0.06	0.06	0.12	0.10	0.77	0.73	0.73	0.71	0.65	0.65
v/c Ratio	0.10	0.06	0.49	0.36	0.18	0.27	0.36	0.05	0.03	0.39	0.02
Control Delay	40.5	48.7	14.6	47.4	24.9	4.7	7.6	0.1	3.5	9.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.5	48.7	14.6	47.4	24.9	4.7	7.6	0.1	3.5	9.2	0.0
LOS	D	D	B	D	C	A	A	A	A	A	A
Approach Delay		19.7			39.4		6.3			8.5	
Approach LOS		B			D		A			A	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 10.3	Intersection LOS: B
Intersection Capacity Utilization 54.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 103: CR 5 & Flora View Dr/Soaring Heights PK-8



First American	ALTA Commitment for Title Insurance
Commitment	ISSUED BY **First American Title Insurance Company** File No: NCS-1063255-CO

COMMITMENT FOR TITLE INSURANCE

Issued By

FIRST AMERICAN TITLE INSURANCE COMPANY

NOTICE

IMPORTANT-READ CAREFULLY: THIS COMMITMENT IS AN OFFER TO ISSUE ONE OR MORE TITLE INSURANCE POLICIES. ALL CLAIMS OR REMEDIES SOUGHT AGAINST THE COMPANY INVOLVING THE CONTENT OF THIS COMMITMENT OR THE POLICY MUST BE BASED SOLELY IN CONTRACT.

THIS COMMITMENT IS NOT AN ABSTRACT OF TITLE, REPORT OF THE CONDITION OF TITLE, LEGAL OPINION, OPINION OF TITLE, OR OTHER REPRESENTATION OF THE STATUS OF TITLE. THE PROCEDURES USED BY THE COMPANY TO DETERMINE INSURABILITY OF THE TITLE, INCLUDING ANY SEARCH AND EXAMINATION, ARE PROPRIETARY TO THE COMPANY, WERE PERFORMED SOLELY FOR THE BENEFIT OF THE COMPANY, AND CREATE NO EXTRACONTRACTUAL LIABILITY TO ANY PERSON, INCLUDING A PROPOSED INSURED.

THE COMPANY'S OBLIGATION UNDER THIS COMMITMENT IS TO ISSUE A POLICY TO A PROPOSED INSURED IDENTIFIED IN SCHEDULE A IN ACCORDANCE WITH THE TERMS AND PROVISIONS OF THIS COMMITMENT. THE COMPANY HAS NO LIABILITY OR OBLIGATION INVOLVING THE CONTENT OF THIS COMMITMENT TO ANY OTHER PERSON.

COMMITMENT TO ISSUE POLICY

Subject to the Notice; Schedule B, Part I-Requirements; Schedule B, Part II-Exceptions; and the Commitment Conditions, ***First American Title Insurance Company***, a Nebraska Corporation (the "Company"), commits to issue the Policy according to the terms and provisions of this Commitment. This Commitment is effective as of the Commitment Date shown in Schedule A for each Policy described in Schedule A, only when the Company has entered in Schedule A both the specified dollar amount as the Proposed Policy Amount and the name of the Proposed Insured.

If all of the Schedule B, Part I-Requirements have not been met within six months after the Commitment Date, this Commitment terminates and the Company's liability and obligation end.

First American Title Insurance Company

Dennis J. Gilmore, President

Greg L. Smith, Secretary

If this jacket was created electronically, it constitutes an original document.

This page is only a part of a 2016 ALTA® Commitment for Title Insurance issued by First American Title Insurance Company. This Commitment is not valid without the Notice; the Commitment to Issue Policy; the Commitment Conditions; Schedule A; Schedule B, Part I-Requirements; Schedule B, Part II-Exceptions.

COMMITMENT CONDITIONS

1. DEFINITIONS

(a) "Knowledge" or "Known": Actual or imputed knowledge, but not constructive notice imparted by the Public Records.
(b) "Land": The land described in Schedule A and affixed improvements that by law constitute real property. The term "Land" does not include any property beyond the lines of the area described in Schedule A, nor any right, title, interest, estate, or easement in abutting streets, roads, avenues, alleys, lanes, ways, or waterways, but this does not modify or limit the extent that a right of access to and from the Land is to be insured by the Policy.
(c) "Mortgage": A mortgage, deed of trust, or other security instrument, including one evidenced by electronic means authorized by law.
(d) "Policy": Each contract of title insurance, in a form adopted by the American Land Title Association, issued or to be issued by the Company pursuant to this Commitment.
(e) "Proposed Insured": Each person identified in Schedule A as the Proposed Insured of each Policy to be issued pursuant to this Commitment.
(f) "Proposed Policy Amount": Each dollar amount specified in Schedule A as the Proposed Policy Amount of each Policy to be issued pursuant to this Commitment.
(g) "Public Records": Records established under state statutes at the Commitment Date for the purpose of imparting constructive notice of matters relating to real property to purchasers for value and without Knowledge.
(h) "Title": The estate or interest described in Schedule A.

2. If all of the Schedule B, Part I—Requirements have not been met within the time period specified in the Commitment to Issue Policy, this Commitment terminates and the Company's liability and obligation end.

3. The Company's liability and obligation is limited by and this Commitment is not valid without:
(a) the Notice;
(b) the Commitment to Issue Policy;
(c) the Commitment Conditions;
(d) Schedule A;
(e) Schedule B, Part I—Requirements; and
(f) Schedule B, Part II—Exceptions.

4. COMPANY'S RIGHT TO AMEND

The Company may amend this Commitment at any time. If the Company amends this Commitment to add a defect, lien, encumbrance, adverse claim, or other matter recorded in the Public Records prior to the Commitment Date, any liability of the Company is limited by Commitment Condition 5. The Company shall not be liable for any other amendment to this Commitment.

5. LIMITATIONS OF LIABILITY

(a) The Company's liability under Commitment Condition 4 is limited to the Proposed Insured's actual expense incurred in the interval between the Company's delivery to the Proposed Insured of the Commitment and the delivery of the amended Commitment, resulting from the Proposed Insured's good faith reliance to:
  (i) comply with the Schedule B, Part I—Requirements;
  (ii) eliminate, with the Company's written consent, any Schedule B, Part II—Exceptions; or
  (iii) acquire the Title or create the Mortgage covered by this Commitment.
(b) The Company shall not be liable under Commitment Condition 5(a) if the Proposed Insured requested the amendment or had Knowledge of the matter and did not notify the Company about it in writing.
(c) The Company will only have liability under Commitment Condition 4 if the Proposed Insured would not have incurred the expense had the Commitment included the added matter when the Commitment was first delivered to the Proposed Insured.
(d) The Company's liability shall not exceed the lesser of the Proposed Insured's actual expense incurred in good faith and described in Commitment Conditions 5(a)(i) through 5(a)(iii) or the Proposed Policy Amount.
(e) The Company shall not be liable for the content of the Transaction Identification Data, if any.
(f) In no event shall the Company be obligated to issue the Policy referred to in this Commitment unless all of the Schedule B, Part I—Requirements have been met to the satisfaction of the Company.
(g) In any event, the Company's liability is limited by the terms and provisions of the Policy.

6. LIABILITY OF THE COMPANY MUST BE BASED ON THIS COMMITMENT

(a) Only a Proposed Insured identified in Schedule A, and no other person, may make a claim under this Commitment.
(b) Any claim must be based in contract and must be restricted solely to the terms and provisions of this Commitment.
(c) Until the Policy is issued, this Commitment, as last revised, is the exclusive and entire agreement between the parties with respect to the subject matter of this Commitment and supersedes all prior commitment negotiations, representations, and proposals of any kind, whether written or oral, express or implied, relating to the subject matter of this Commitment.
(d) The deletion or modification of any Schedule B, Part II—Exception does not constitute an agreement or obligation to provide coverage beyond the terms and provisions of this Commitment or the Policy.
(e) Any amendment or endorsement to this Commitment must be in writing and authenticated by a person authorized by the Company.
(f) When the Policy is issued, all liability and obligation under this Commitment will end and the Company's only liability will be under the Policy.

7. IF THIS COMMITMENT HAS BEEN ISSUED BY AN ISSUING AGENT

The issuing agent is the Company's agent only for the limited purpose of issuing title insurance commitments and policies. The issuing agent is not the Company's agent for the purpose of providing closing or settlement services.

8. PRO-FORMA POLICY

The Company may provide, at the request of a Proposed Insured, a pro-forma policy illustrating the coverage that the Company may provide. A pro-forma policy neither reflects the status of Title at the time that the pro-forma policy is delivered to a Proposed Insured, nor is it a commitment to insure.

9. ARBITRATION

The Policy contains an arbitration clause. All arbitrable matters when the Proposed Policy Amount is $2,000,000 or less shall be arbitrated at the option of either the Company or the Proposed Insured as the exclusive remedy of the parties. A Proposed Insured may review a copy of the arbitration rules at http://www.alta.org/arbitration.

Transaction Identification Data for reference only:

Issuing Agent: First American Title Insurance Company National Commercial Services

Issuing Office: 1125 17th Street, Suite 500, Denver, CO 80202

Commitment No.: NCS-1063255-CO

Phone Number: (303)876-1112

Property Address: Bridgewater Amendment No 2, Erie, CO

Issuing Office File No.: NCS-1063255-CO

Revision No.:

SCHEDULE A

1. Commitment Date: April 21, 2021 at 5:00 PM
2. Policy or Policies to be issued: None, See Schedule B, Part I
   (a) ☐ ALTA® Owner's Policy (6-17-06)
   Proposed Insured:
   Proposed Policy Amount: $
   (b) ☐ ALTA® Loan Policy (6-17-06)
   Proposed Insured:
   Proposed Policy Amount: $
3. The estate or interest in the Land described or referred to in this Commitment is Fee Simple.
4. The Title is, at the Commitment Date, vested in:

   Daybreak Recovery Acquisition LLC, a Delaware limited liability company
5. The Land is described as follows:

   See Exhibit "A" attached hereto and made a part hereof

Exhibit A

Commitment No.: NCS-1063255-CO

The Land referred to herein below is situated in the County of Weld, State of Colorado, and is described as follows:

A parcel of land located in the Southeast quarter of Section 8, Township 1 North, Range 68 West of the 6th P.M., Town of Erie, County of Weld, State of Colorado, described as follows:

Beginning at the Southeast corner of said Section 8 (a 2.5" aluminum cap marked LS 23501, 1993) from whence the South quarter corner of Section 8 (a 3.25" aluminum cap marked 38252, 2018) lies S 9+°02'00" W, 2,648.14 feet (basis of bearings);

Thence S 89°01'00" W, 2648.14 feet along the Southerly line of the Southeast quarter;

Thence N 00°01'05" E, 1,609.82 feet along the Westerly line of the Southeast quarter to the Southerly line of a parcel described as "UP CO V7/4 Pcl2" in Deed recorded June 26, 2009 at Reception No. 3632827 (previously Union Pacific Railroad Right of Way);

Thence along the Southerly line of said parcel the following three courses;

1) N 42°44'02" E, 466.98 feet;
2) 1,737.57 feet along the arc of a non-tangent curve to the right, said curve having a radius of 1,859.88 feet, a central angle of 53°31'41", and a chord bearing N 69°30'25" E, 1,675.06 feet;
3) S 83°44'07" W, 2,406.70 feet along said Westerly line to the Point of Beginning.

Legal Description Provided by:
Hurst & Associates Inc.
1265 S. Public Road, Suite B
Lafayette, CO 80026
303-449-9105

For informational purposes only: APNs: 146708401028, 146708401026, 146708401025 and 146708401024

Commitment No.: NCS-1063255-CO

SCHEDULE B, PART I

Requirements

LIMITATION OF LIABILITY FOR INFORMATIONAL REPORT

IMPORTANT – READ CAREFULLY: THIS REPORT IS NOT AN INSURED PRODUCT OR SERVICE OR A REPRESENTATION OF THE CONDITION OF TITLE TO REAL PROPERTY. IT IS NOT AN ABSTRACT, LEGAL OPINION, OPINION OF TITLE, TITLE INSURANCE COMMITMENT OR PRELIMINARY REPORT, OR ANY FORM OF TITLE INSURANCE OR GUARANTY. THIS REPORT IS ISSUED EXCLUSIVELY FOR THE BENEFIT OF THE APPLICANT THEREFOR, AND MAY NOT BE USED OR RELIED UPON BY ANY OTHER PERSON. THIS REPORT MAY NOT BE REPRODUCED IN ANY MANNER WITHOUT FIRST AMERICAN'S PRIOR WRITTEN CONSENT. FIRST AMERICAN DOES NOT REPRESENT OR WARRANT THAT THE INFORMATION HEREIN IS COMPLETE OR FREE FROM ERROR, AND THE INFORMATION HEREIN IS PROVIDED WITHOUT ANY WARRANTIES OF ANY KIND, AS-IS, AND WITH ALL FAULTS. AS A MATERIAL PART OF THE CONSIDERATION GIVEN IN EXCHANGE FOR THE ISSUANCE OF THIS REPORT, RECIPIENT AGREES THAT FIRST AMERICAN'S SOLE LIABILITY FOR ANY LOSS OR DAMAGE CAUSED BY AN ERROR OR OMISSION DUE TO INACCURATE INFORMATION OR NEGLIGENCE IN PREPARING THIS REPORT SHALL BE LIMITED TO THE FEE CHARGED FOR THE REPORT. RECIPIENT ACCEPTS THIS REPORT WITH THIS LIMITATION AND AGREES THAT FIRST AMERICAN WOULD NOT HAVE ISSUED THIS REPORT BUT FOR THE LIMITATION OF LIABILITY DESCRIBED ABOVE. FIRST AMERICAN MAKES NO REPRESENTATION OR WARRANTY AS TO THE LEGALITY OR PROPRIETY OF RECIPIENT'S USE OF THE INFORMATION HEREIN.

Commitment No.: NCS-1063255-CO

SCHEDULE B, PART II

Exceptions

THIS COMMITMENT DOES NOT REPUBLISH ANY COVENANT, CONDITION, RESTRICTION, OR LIMITATION CONTAINED IN ANY DOCUMENT REFERRED TO IN THIS COMMITMENT TO THE EXTENT THAT THE SPECIFIC COVENANT, CONDITION, RESTRICTION, OR LIMITATION VIOLATES STATE OR FEDERAL LAW BASED ON RACE, COLOR, RELIGION, SEX, SEXUAL ORIENTATION, GENDER IDENTITY, HANDICAP, FAMILIAL STATUS, OR NATIONAL ORIGIN.

The Policy will not insure against loss or damage resulting from the terms and provisions of any lease or easement identified in Schedule A, and will include the following Exceptions unless cleared to the satisfaction of the Company:

1. Any facts, rights, interests or claims which are not shown by the Public Records, but which could be ascertained by an inspection of the Land or by making inquiry of persons in possession thereof.

2. Easements, or claims of easements, not shown by the Public Records.

3. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, and any facts which a correct land survey and inspection of the Land would disclose, and which are not shown by the Public Records.

4. Any lien or right to a lien for services, labor, material or equipment, unless such lien is shown by the Public Records at Date of Policy and not otherwise excepted from coverage herein.

5. Any and all unpaid taxes, assessments and unredeemed tax sales.

6. Any water rights, claims of title to water, in, on or under the Land.

7. Any existing leases or tenancies.

8. Right of way for County Roads 30 feet on either side of Section and Township lines, as established by the Board of County Commissioners recorded October 14, 1889 in Book 86 at Page 273.

9. An easement fortelecommunications system and incidental purposes granted to Mountain States Telephone and Telegraph Company, as set forth in an instrument recorded October 12, 1971 at Reception No. 1576620 in Book 655.

10. All oil, gas, minerals and other mineral rights as conveyed by instrument recorded November 30, 1972 at Reception No. 1602712 in Book 681.

11. Terms, conditions, provisions, obligations, easements and agreements as set forth in the Easement Deed granting right of way easement granted to Vessels Oil and Gas Company, but reserving unto grantor the right to construct at any and all times and maintain roads, highways, railroad tracks, pipelines and telephone, telegraph and electric power pole and wire lines recorded February 13, 1986 at Reception No. 2042899 in Book 1103.

12. Reservation ofoil and gas to Union Pacific Land Resources Corporation and covenants regarding disclosure of mining operations as set forth in Special Warranty Deed recorded November 17, 2000 at Reception No. 2807516.

13. Terms, conditions, provisions, obligations and agreements as set forth in the Agreement for Compatible Development recorded November 17, 2000 at Reception No. 2807515.

14. Terms, conditions, provisions, obligations and agreements as set forth in the Surface Use Agreement recorded September 26, 2003 at Reception No. 3110572.

15. Terms, conditions, provisions, obligations and agreements as set forth in the Surface Use Agreement evidenced by that certain Memorandum of Surface Use Agreement recorded August 25, 2005 at Reception No. 3316658 and Corrected Memorandum of Surface Damage and Release Agreement recorded November 1, 2010 at Reception No. 3729056.

16. Terms, conditions, provisions, obligations and agreements as set forth in the Surface Use Agreement as evidenced by that certain Memorandum of Surface Use Agreement recorded March 13, 2007 at Reception No. 3461612 and Corrected Memorandum of Surface Damage and Release Agreement recorded November 1, 2010 at Reception No. 3729057.

17. Terms, conditions, provisions, obligations, easements and agreements as set forth in the Right of Way Grant recorded September 20, 2007 at Reception No. 3505741. Amendment of Right-Of-Way Grant recorded May 13, 2014 at Reception No. 4015765.

18. The effect of Ordinance No. 30-2007 regarding Zoning recorded November 19, 2007 at Reception No. 3518315.

19. The effect of Ordinance 29-2007 regarding Annexation recorded November 19, 2007 at Reception No. 3518316.

20. Terms, conditions, provisions, obligations and agreements as set forth in the Annexation Agreement recorded November 19, 2007 at Reception No. 3518317, First Amendment recorded December 30, 2010 at Reception No. 3741841, Second Amendment recorded October 12, 2011, at Reception No. 3798317 and Third Amendment recorded January 23, 2013 at Reception No. 3904988, Seventh Amendment recorded September 16, 2020 at Reception No. 4630283.

Partial Assignment and Assumption of Annexation Agreement Rights and Obligations recorded August 13, 2013 at Reception No. 3955793.

21. Terms, conditions, provisions, obligations and agreements as set forth in the Grant of Permanent Avigation Easement recorded November 19, 2007 at Reception No. 3518318.

22. The effect of Bridgewater Annexation Map to the Town of Erie recorded November 19, 2007 at Reception No. 3518319.

23. The effect of Bridgewater Zoning Map recorded November 19, 2007 at Reception No. 3518320 and Amendment No. 1 recorded August 31, 2011, at Reception No. 3789471.

24. The effect of Bridgewater P.U.D. Overlay Map recorded November 19, 2007 at Reception No. 3518321 and Amendment No. 1 recorded August 31, 2011, at Reception No. 3789472 and Amendment No. 2 recorded May 29, 2013 at Reception No. 3935464 and Amendment No. 3 recorded November 3, 2015 at Reception No. 4155346, Amendment No. 4 recorded July 23, 2019 at Reception No. 4508046 and Amendment No. 5 recorded January 5, 2021 at Reception No. 4667978.

25. Terms, conditions, provisions, obligations, easements and agreements as set forth in the Right of Way Grant recorded January 21, 2009 at Reception No. 3600584.

26. Reservation ofall minerals as set forth in Quitclaim Deed recorded April 14, 1971 at Reception No. 1565713.

27. Oil and Gas Lease recordedNovember 30, 1972 at Reception No. 1602713. Affidavit of Lease Extension recorded January 11, 1979 at Reception No. 1778417.

28. Any tax, lien, fee or assessment by reason of inclusion of subject property in the Bridgewater Metropolitan District No. 3, as evidenced by instrument recorded June 24, 2008 at Reception No. 3562681.

29. Ordinance No. 08-2011, Series 2011, for Rezoning, recorded August 31, 2011, at Reception No. 3789473.

30. Ordinance No. 09-2011, Series 2011, for PUD Overlay rezoning, recorded August 31, 2011, at Reception No. 3789474.

31. Terms, conditions, provisions, obligations, easements and agreements as set forth in the Surface Use Agreement recorded October 18, 2011, at Reception No. 3799568 and the First Amendment thereto recorded April 25, 2019 at Reception No. 4484091.

32. Easements, notes, covenants, restrictions and rights-of-way as shown on the plat of Bridgewater Master Subdivision, recorded December 13, 2011, at Reception No. 3811552.

NOTE: Ordinance No. 18-2015, Series of 2015 in connection therewith recorded June 22, 2015 at Reception No. 4117798.

33. Any tax, lien, fee or assessment by reason of inclusion of subject property in the Northern Colorado Water Conservancy District, as evidenced by instrument recorded March 8, 2012 at Reception No. 3830699 and March 13, 2012 at Reception No. 3831541.

34. Covenants, conditions, restrictions and provisions as set forth in Master Declaration of Covenants, Conditions and Restrictions of Daybreak recorded May 29, 2013 at Reception No. 3935465, but omitting any covenant or restriction based on race, color, religion, sex, handicap, familial status, or national origin, and any and all amendments, assignments, or annexations thereto.

Amendment thereto recorded May 29, 2013 at Reception No. 3935454.

First Amendment to Master Declaration of Covenants, Conditions and Restrictions of DayBreak recorded April 28, 2014 at Reception No. 4012251.

Partial Assignment of Declarant Rights recorded January 4, 2017 at Reception No. 4267367.

35. Terms, conditions, provisions, obligations and agreements as set forth in the Covenant of Surface and Mineral Rights recorded August 13, 2013 at Reception No. 3955789.

36. Terms, conditions, provisions, obligations, easements and agreements as set forth in the Right-Of-Way Grant recorded March 20, 2017 at Reception No. 4286866 and amended by Amendment of Right-of-Way Grant recorded March 3, 2020 at Reception No. 4571526.

37. Request for Notification of Surface Development recorded June 19, 2019 at Reception No. 4498649 and Amended Request for Notification of Surface Development recorded July 17, 2019 at Reception No. 4506252.

DISCLOSURE STATEMENT

Pursuant to C.R.S. 30-10-406(3)(a) all documents received for recording or filing in the Clerk and Recorder's office shall contain a top margin of at least one inch and a left, right and bottom margin of at least one-half of an inch. The Clerk and Recorder will refuse to record or file any document that does not conform to the requirements of this section.

NOTE: If this transaction includes a sale of the property and the price exceeds $100,000.00, the seller must comply with the disclosure/withholding provisions of C.R.S. 39-22-604.5 (Nonresident withholding).

NOTE: Colorado Division of Insurance Regulations 8-1-2 requires that "Every title insurance company shall be responsible to the proposed insured(s) subject to the terms and conditions of the title commitment, other than the effective date of the title commitment, for all matters which appear of record prior to the time of recording whenever the title insurance company, or its agent, conducts the closing and settlement service that is in conjunction with its issuance of an owner's policy of title insurance and is responsible for the recording and filing of legal documents resulting from the transaction which was closed.

Pursuant to C.R.S. 10-11-122, the company will not issue its owner's policy or owner's policies of title insurance contemplated by this commitment until it has been provided a Certificate of Taxes due or other equivalent documentation from the County Treasurer or the County Treasurer's authorized agent; or until the Proposed Insured has notified or instructed the company in writing to the contrary.

The subject property may be located in a special taxing district. A Certificate of Taxes due listing each taxing jurisdiction shall be obtained from the County Treasurer or the County Treasurer's authorized agent. Information regarding special districts and the boundaries of such districts may be obtained from the Board of County Commissioners, the County Clerk and Recorder, or the County Assessor.

C.R.S. 10-11-122 (4), Colorado Notaries may remotely notarize real estate deeds and other documents using real-time audio-video communication technology. You may choose not to use remote notarization for any document.

NOTE: Pursuant to CRS 10-11-123, notice is hereby given:

This notice applies to owner's policy commitments containing a mineral severance instrument exception, or exceptions, in Schedule B, Section 2.

A. **That there is recorded evidence that a mineral estate has been severed, leased, or otherwise conveyed from the surface estate and that there is a substantial likelihood that a third party holds some or all interest in oil, gas, other minerals, or geothermal energy in the property; and**
B. **That such mineral estate may include the right to enter and use the property without the surface owner's permission.**

NOTE: Pursuant to Colorado Division of Insurance Regulations 8-1-1, Affirmative mechanic's lien protection for the Owner may be available (typically by deletion of Exception no. 4 of Schedule B, Section 2 of the Commitment from the Owner's Policy to be issued) upon compliance with the following conditions:

A. **The land described in Schedule A of this commitment must be a single family residence which includes a condominium or townhouse unit.**
B. **No labor or materials have been furnished by mechanics or material-men for purposes of construction on the land described in Schedule A of this Commitment within the past 6 months.**

C. **The Company must receive an appropriate affidavit indemnifying the Company against un-filed mechanic's and material-men's liens.**
D. **The Company must receive payment of the appropriate premium**.
E. **If there has been construction, improvements or major repairs undertaken on the property to be purchased within six months prior to the Date of the Commitment, the requirements to obtain coverage for unrecorded liens will include: disclosure of certain construction information; financial information as to the seller, the builder and or the contractor; payment of the appropriate premium, fully executed Indemnity Agreements satisfactory to the company, and, any additional requirements as may be necessary after an examination of the aforesaid information by the Company.**

No coverage will be given under any circumstances for labor or material for which the insured has contracted for or agreed to pay.

NOTE: Pursuant to C.R.S. 38-35-125(2) no person or entity that provides closing and settlement services for a real estate transaction shall disburse funds as a part of such services until those funds have been received and are available for immediate withdrawal as a matter of right.

NOTE: C.R.S. 39-14-102 requires that a real property transfer declaration accompany any conveyance document presented for recordation in the State of Colorado. Said declaration shall be completed and signed by either the grantor or grantee.

NOTE: Pursuant to CRS 10-1-128(6)(a), It is unlawful to knowingly provide false, incomplete, or misleading facts or information to an insurance company for the purpose of defrauding or attempting to defraud the company. Penalties may include imprisonment, fines, denial of insurance and civil damages. Any insurance company or agent of an insurance company who knowingly provides false, incomplete, or misleading facts or information to a policyholder or claimant for the purpose of defrauding or attempting to defraud the policyholder or claimant with regard to a settlement or award payable from insurance proceeds shall be reported to the Colorado division of insurance within the department of regulatory agencies.

Nothing herein contained will be deemed to obligate the company to provide any of the coverages referred to herein unless the above conditions are fully satisfied.

1101 Bannock Street
Denver, Colorado 80204
303.892.1166

NORRIS DESIGN

September 17, 2015

Town of Erie
Community Development Department – Planning Division
645 Holbrook Street
PO Box 750
Erie, Colorado 80516

Re: Colliers Hill Planning and Entitlements

This letter is being submitted on behalf of Daybreak Recovery Acquisition LLC, the "Property Owner," at your request, and hereby authorizes RainTree Investment Corporation and its representative, Jerry B. Richmond III, to submit planning and entitlement documents on our behalf.

Please note that, upon completion of the appropriate reviews and prior to submittal of a final plat, the Property Owner will sign the formal documents before any recordation of these documents will occur.

Please feel free to contact me if you have any questions or concerns.

Sincerely,

Mr. Jon Shumaker
Authorized Signatory for Daybreak Recovery Acquisition LLC
Cc: Michael McDonnell
Jerry B. Richmond III

PHASE I DRAINAGE REPORT
COLLIERS HILL FILING 6
ERIE, COLORADO

Prepared For:
Daybreak Recovery Acquisition, LLC
c/o Raintree Investments Corp.
7200 S. Alton Way, Suite C-400
Centennial, CO 80112

Prepared By:
Hurst and Associates, Inc.
1265 S. Public Rd., Suite B
Lafayette, CO 80026

Job Number 2527-02
October 27, 2020

ENGINEER'S CERTIFICATION

I hereby certify that this Phase I drainage report for the design of Colliers Hill Filing 6 was prepared by me (or under my direct supervision) in accordance with the provisions of the *Town of Erie Standards and Specifications* for the owners thereof. I understand that the Town of Erie does not and will not assume liability for drainage facilities designed by others, including the designs presented in this report.

John W. Jorgenson, P.E.
Colorado License #22730

TOWN ACCEPTANCE

This report has been reviewed and found to be in general compliance with the *Town of Erie Standards and Specifications for Design and Construction* and other Town requirements. **THE ACCURACY AND VALIDITY OF THE ENGINEERING DESIGN, DETAILS, DIMENSIONS, QUANTITIES, AND CONCEPTS IN THIS REPORT REMAINS THE SOLE RESPONSIBILITY OF THE PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE APPEAR HEREON**.

Accepted by: _____ _____
Town Engineer Date

I. GENERAL LOCATION AND DESCRIPTION

Colliers Hill (formerly Daybreak and Bridgewater) is a 940-acre residential community located within Sections 8, 17 and 18, Township 1 North, Range 68 West. Sections 8, 17 and 18 are contiguous and located just east of Old Town Erie, north of Erie Parkway and west of Weld County Road 5. The overall development has a maximum overall density of 2,880 residential units. Colliers Hill Filing 6 is a 151.72-acre tract of land located within the Southeast Quarter of said Section 8 and at the northwest corner of Weld County Road 10 and Weld County Road 5. Colliers Hill 6 is anticipated to have 454 single-family attached and detached units.

The site is currently undeveloped and covered with native vegetation. The on-site soils are about 50% Wiley-Colby Complex (Hydrologic Soil Group B) and 50% approximately Weld Loam soils (Hydrologic Soil Group C). Runoff from the site will be conveyed north and westerly across the site to two proposed ponds (one on site and one off-site) at typical slopes ranging from 1.0% to 4.0%. The runoff that goes to the west will enter an off-site detention pond and outfall to the regional drainage channel. The runoff that goes to the north will enter an on-site detention pond and outfall to an existing culvert that goes under the RTD Railroad.

II. DRAINAGE BASINS

Colliers Hill Filing 6 lies within Boulder Creek Drainage Basin. Colliers Hill Filing 6 does not lie within the 100-year floodplain per FIRM Maps 08013C0442J and 08013C0435J dated December 18, 2012. There are no designated wetlands within the proposed development.

Storm runoff from Colliers Hill Filing 6 will drain to two proposed detention ponds. The off-site pond just west of the site will outfall into the regional drainage channel, while the on-site pond to the north will outfall into an existing culvert that goes under RTD railroad. Please refer to *Phase III Drainage Report Colliers Hill Filings 4 & 5* as prepared by Hurst & Associates, Inc and dated July 27, 2017 for the design of the regional channel.

III. DRAINAGE FACILITY DESIGN

Storm runoff from the site, the western one-half of Weld County Road 5, and northern one-half of Weld County Road 10 adjacent to the site will be intercepted by a proposed storm sewer system and be conveyed to the two proposed detention ponds. The storm sewer system will be designed for the 2-year minor storm event. The 100-year flows in excess of the storm sewer capacity will be conveyed by streets and swales to the two detention ponds. The western half of the site will drain into a proposed off-site detention pond that will have a downstream impact stilling basin located within the regional channel. The developer is currently working with the adjacent landowner to acquire the necessary easements for the proposed drainage facilities. The eastern half will drain into a proposed on-site detention pond that will outfall to an existing culvert. Release rates will conform with current Town of Erie requirements. Detention pond maintenance will be provide initially by the metropolitan district and ultimately by the Colliers Hill H.O.A. Maintenance access will be provided within the open area.

IV. SUMMARY

The Colliers Hill Filing 6 drainage facilities will be designed to capture developed runoff and convey those flows to two proposed detention ponds, that will either outfall to the regional drainage channel or an existing culvert. The facilities will generally conform to the Town of Erie's outfall system plan and facilities will be designed using Urban Drainage and Town of Erie Criteria.

This report proposes a conceptual drainage design for the proposed development. Detailed facility design will be presented with Phase II and Phase III drainage reports.

V. REFERENCES

1. Town of Erie, Colorado. 2019. *Standards and Specifications for Design and Construction of Public Improvements.*
2. Urban Drainage and Flood Control District. June 2001, Revised August 2018. *Urban Storm Drainage Criteria Manual Volumes 1 and 2.*
3. Urban Drainage and Flood Control District. October 2019. *Urban Storm Drainage Criteria Manual Volume 3, Best Management Practices.*
4. Hurst & Associates, Inc. July 27, 2017 *Phase III Drainage Report Colliers Hill Filings 4 &5.*

5. Merrick. January 2020 *Town of Erie Outfall Systems Plan (East of Coal Creek)*

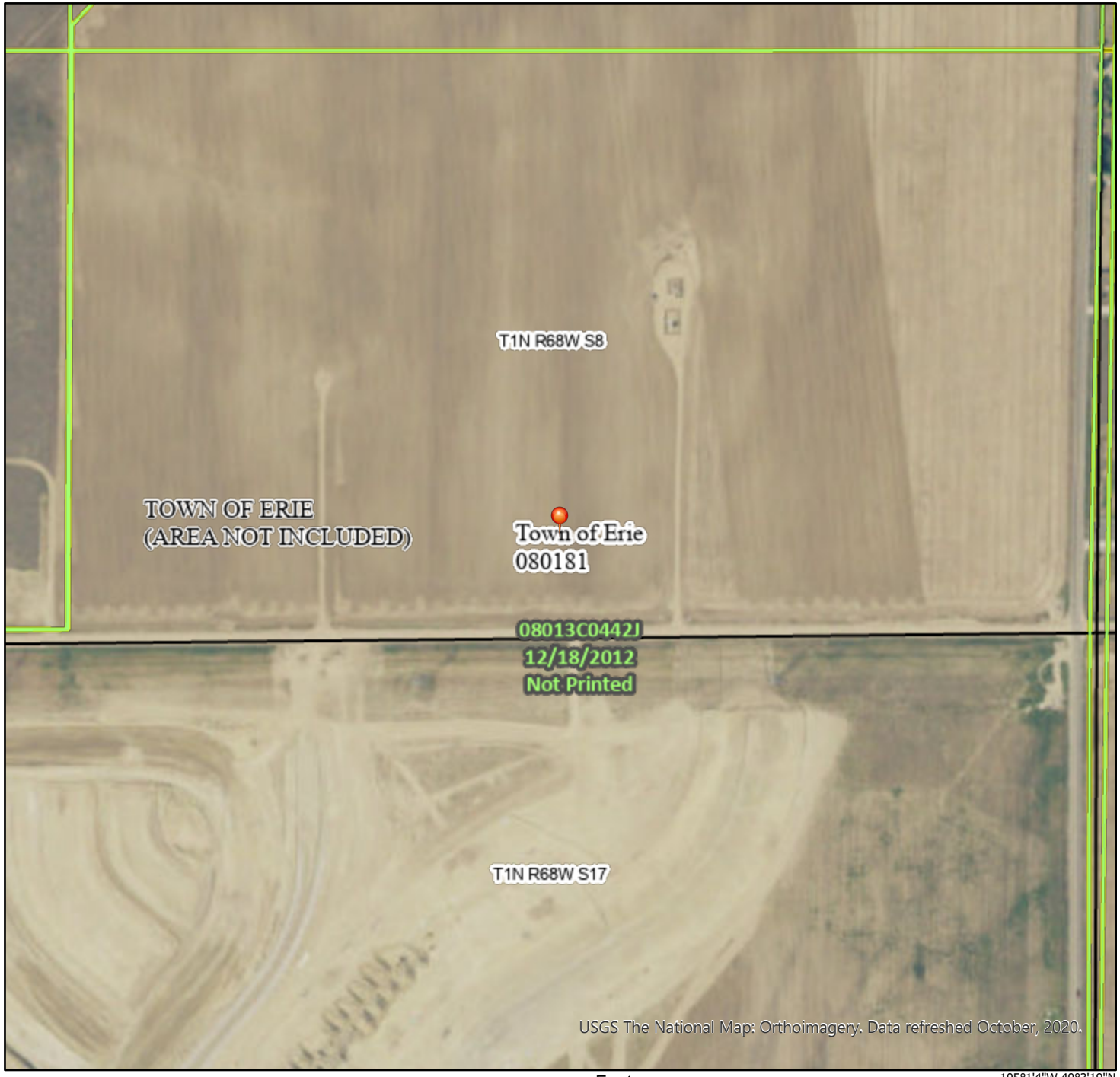
VI. APPENDICES

APPENDIX A
MAPS

National Flood Hazard Layer FIRMette

FEMA

105°1'42"W 40°3'46"N



105°1'4"W 40°3'19"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

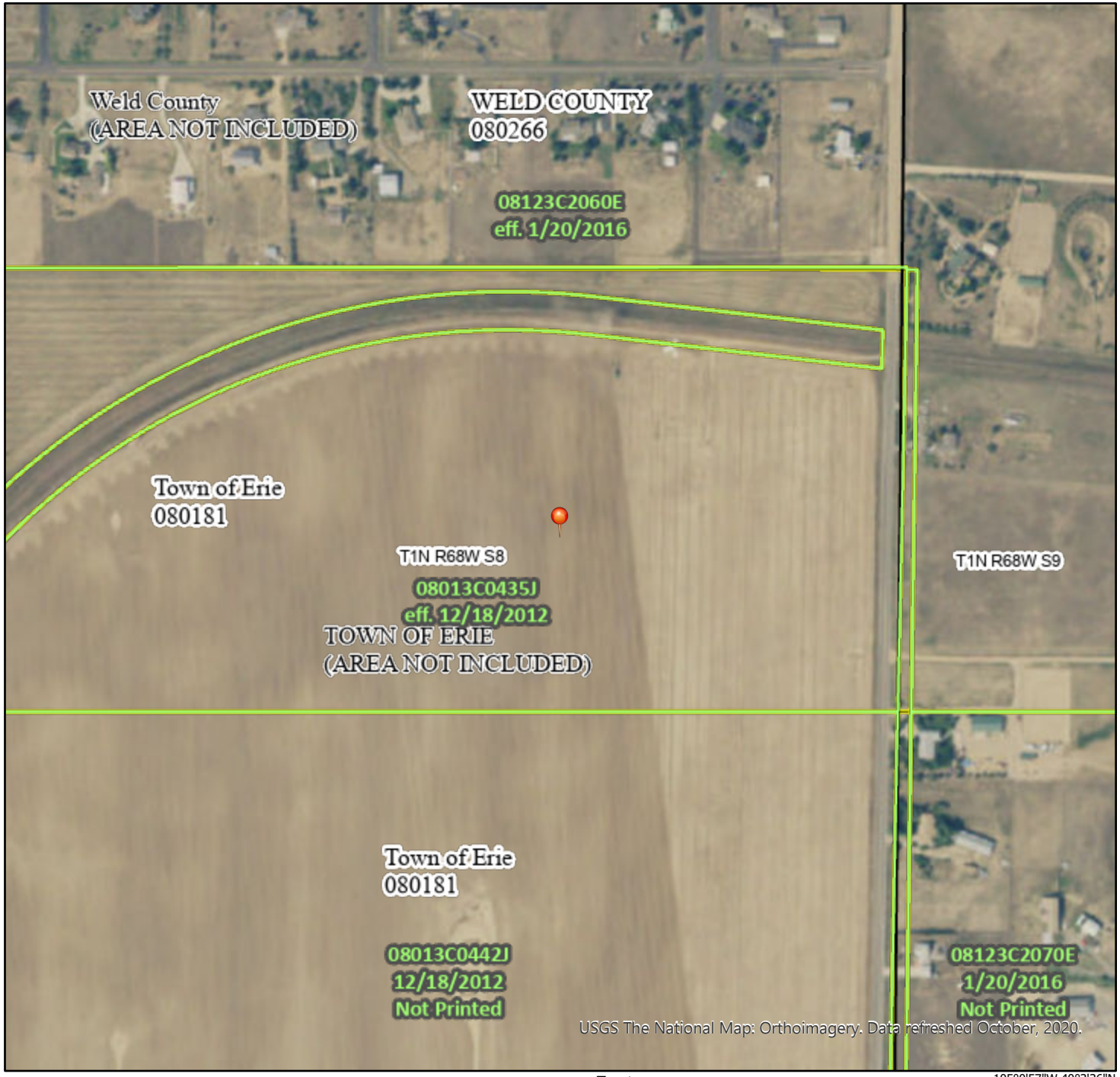
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/23/2020 at 5:01 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

National Flood Hazard Layer FIRMette

FEMA

105°1'35"W 40°4'3"N



105°0'57"W 40°3'36"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
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- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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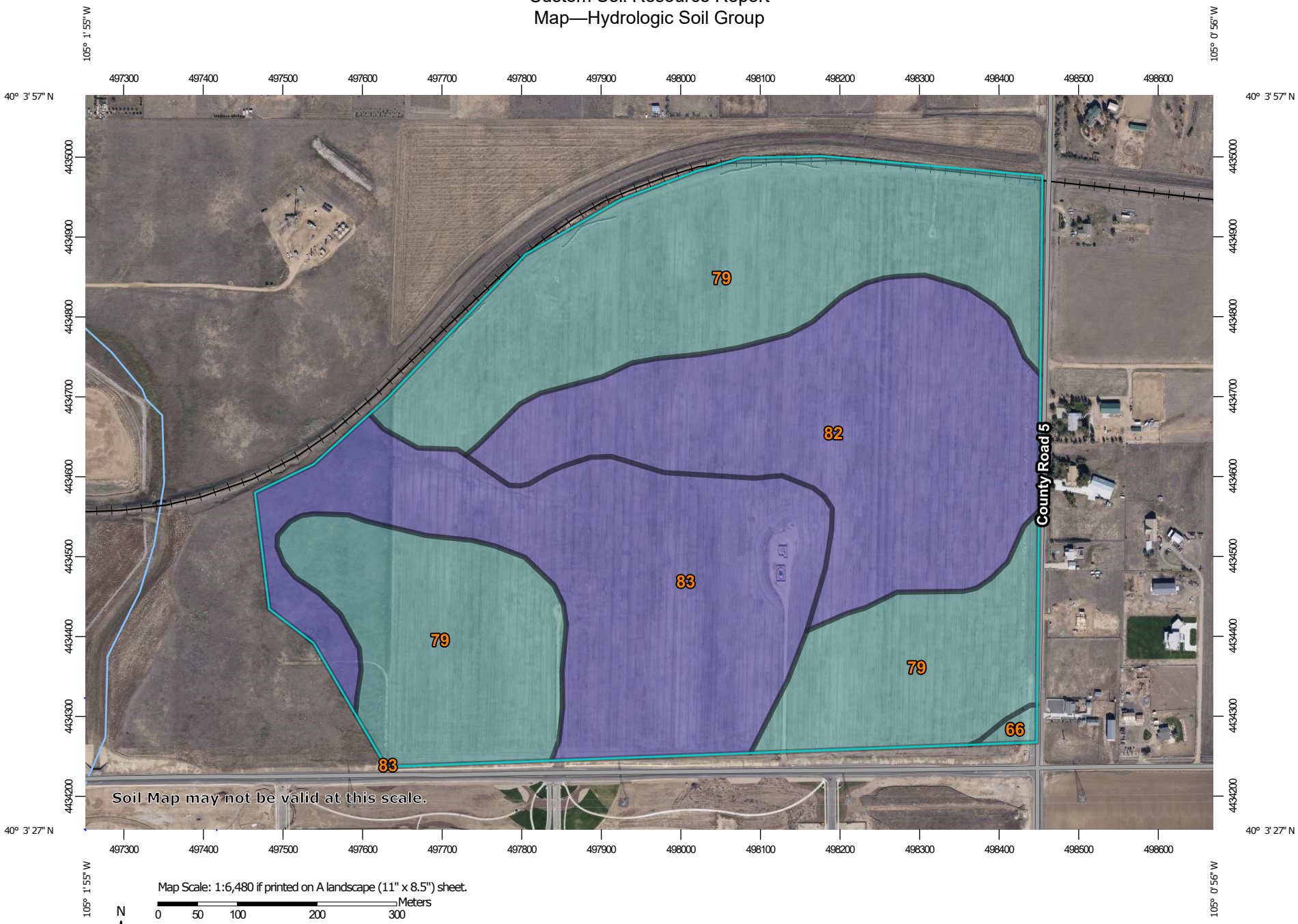
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/23/2020 at 5:03 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:6,480 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 300 600 1200 1800

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

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: Weld County, Colorado, Southern Part
Survey Area Data: Version 19, Jun 5, 2020

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

Date(s) aerial images were photographed: Oct 1, 2018—Oct 31, 2018

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.

Table—Hydrologic Soil Group

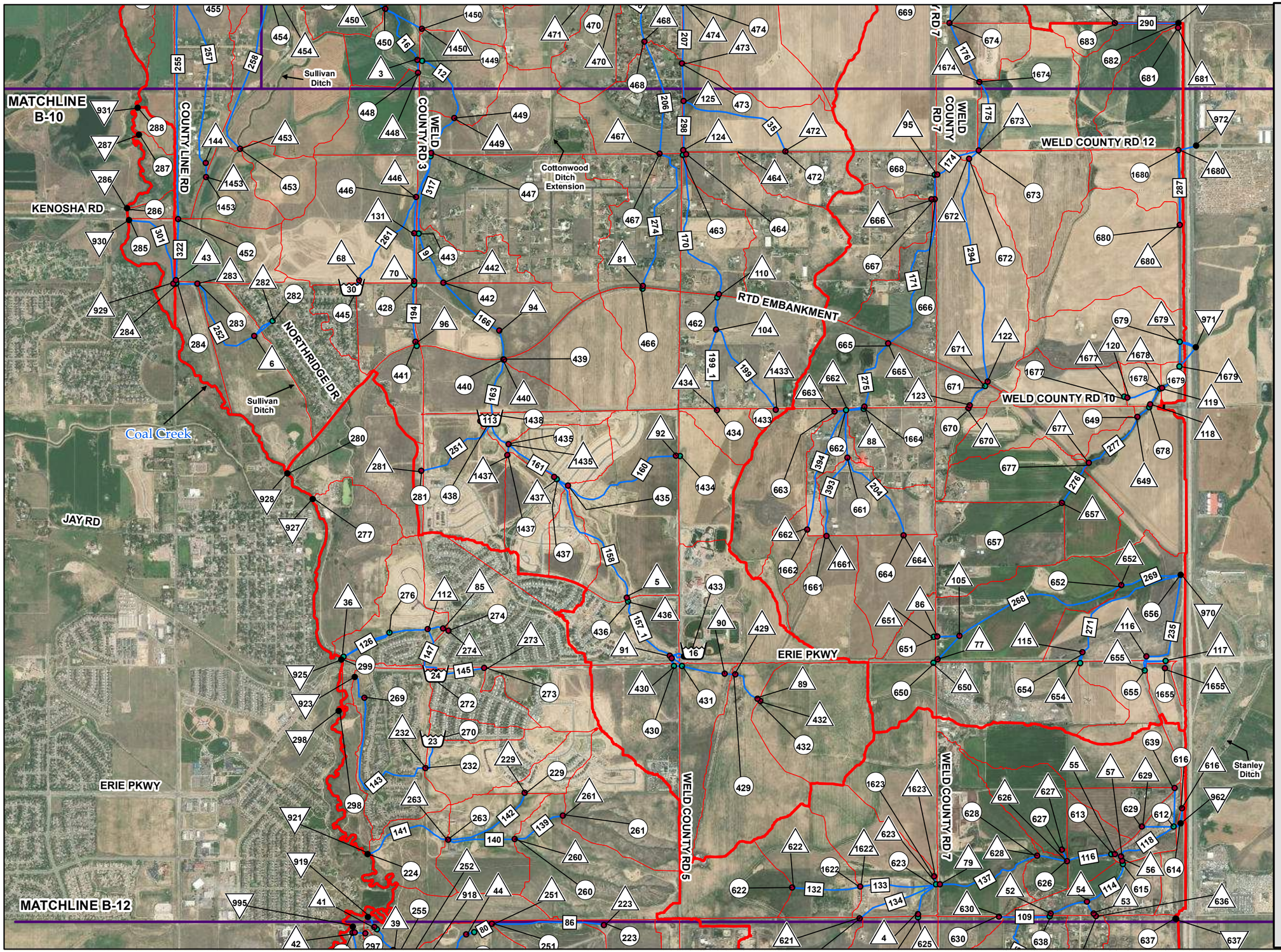
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
66	Ulm clay loam, 0 to 3 percent slopes	C	0.5	0.4%
79	Weld loam, 1 to 3 percent slopes	C	71.8	48.0%
82	Wiley-Colby complex, 1 to 3 percent slopes	B	38.6	25.8%
83	Wiley-Colby complex, 3 to 5 percent slopes	B	38.5	25.8%
Totals for Area of Interest			**149.5**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



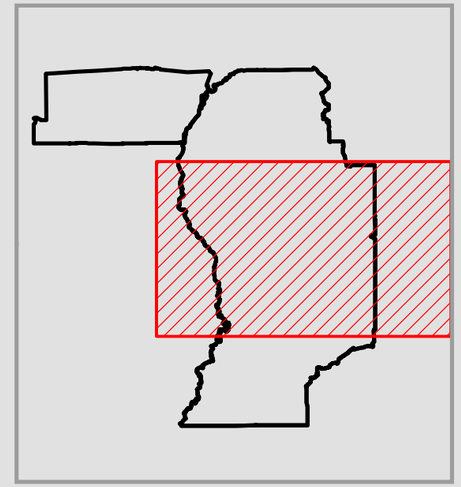
Legend

- Study Area Boundary
- Subcatchments
- Major Watershed Boundary

SWMM Elements

- Subbasin
- Design Points
- Conveyance Element
- Detention Facility
- Outfall

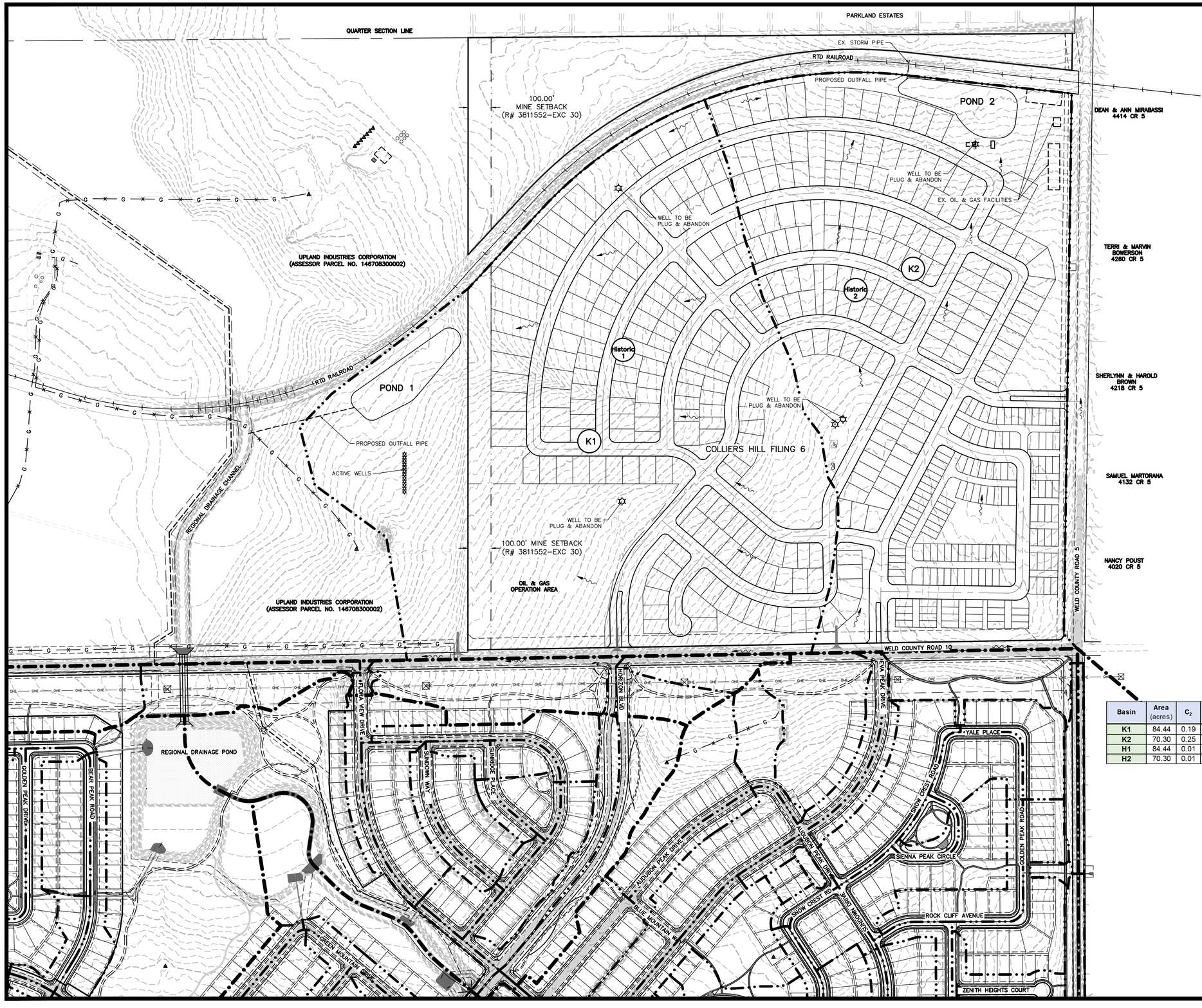
KEY MAP



N
W E
S

0 1,000 2,000
Feet

MERRICK® Merrick and Company, 2480 W 26th Ave, Unit B225, Denver, CO 80211, Phone: 303-964-3333, Fax: 303-964-3355	TOWN OF ERIE	TOWN OF ERIE OUTFALL SYSTEMS PLAN (EAST OF COAL CREEK)	SWMM ROUTING MAP	FIGURE B-11



LEGEND

- Existing Contours
- Proposed Contours
- Flow Arrow
- B2 — Basin Designation
- Basin Boundary
- Major Basin Boundary

Basin	Area (acres)	C_2	C_{10}	C_{100}	T_c (mins)	I_2 (in/hr)	I_{10} (in/hr)	I_{100} (in/hr)	Q_2 (cfs)	Q_{10} (cfs)	Q_{100} (cfs)
K1	84.44	0.19	0.30	0.57	28.6	*1.31*	*2.24*	*4.33*	**20.48**	**57.23**	**209.18**
K2	70.30	0.25	0.37	0.61	33.7	*1.19*	*2.03*	*3.92*	**20.86**	**52.34**	**167.99**
H1	84.44	0.01	0.11	0.46	42.2	*1.03*	*1.77*	*3.41*	**0.82**	**16.23**	**133.25**
H2	70.30	0.01	0.11	0.46	53.0	*0.89*	*1.53*	*2.94*	**0.60**	**11.95**	**96.20**

0 200' 400'
SCALE: 1" = 200'

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

72 HOURS BEFORE YOU DIG CALL THE UTILITY NOTIFICATION CENTER OF COLORADO (U.N.C.C.) 811
GAS, ELECTRIC, TELEPHONE, CATV AND PARKING LOT/STREET LIGHTING LOCATIONS

REVISIONS

NO.	DESCRIPTION	DATE	BY
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HURST & ASSOCIATES, INC.
1265 S. Public Road, Suite B
Lafayette, CO 80026
303.449.9105

HURST
CIVIL ENGINEERING
PLANNING
SURVEYING

COLLIERS HILL FILING 6
ERIE, CO
PHASE 1 DRAINAGE REPORT
DRAINAGE PLAN

Prepared for:
DAYBREAK RECOVERY ACQUISITION LLC

DRAWN BY:	RH
DESIGNED BY:	RH
DRAWING NAME:	CHS-PH1-DR
APPROVED BY:	JJ
JOB NUMBER:	2527-02
DATE:	10/23/2020
SCALE:	1"=200'
SHEET NO:	1 OF 1

LAST SAVED: 10/27/2020 11:58 AM
G:\2527\Y6 Sketch Plan\CH6-PH1-DR.dwg

CRESTONE PEAK
RESOURCES

Town of Erie Board of Trustees
645 Holbrook Street
PO BOX 750
Erie, CO 80516

February 26, 2021

Dear Erie Board of Trustees

Crestone Peak Resources ("Crestone") and Daybreak Recovery Acquisition LLC ("Developer") are in the process of negotiating an agreement ('the Agreement") to plug and abandon and conduct reclamation on the locations of the five producing Oil & Gas Wells ("the Wells") and facilities ("Facilities") located on the Colliers Hill Filing #6 development site in the SE/4, Section 8, Township 1 North, Range 68 West, 6th P.M ("Site").

The Wells are specifically identified below:

- Woolley 33-8
- Woolley 43-8
- Woolley 43-8
- Woolley 44-8
- Woolley K Unit 1

Crestone and Developer are in the process of drafting an agreement that includes, among other things, the following essential items:

1. The Wells will be plugged and abandoned within 12 months of notice and delivery of any agreed upon considerations to Crestone from Developer, and the well Site will be reclaimed per Colorado Oil and Gas Conservation Commission rules and regulations.

2. Crestone will provide a release of all environmental liability for the reclaimed portions of the Site.

10188 EAST I-25 FRONTAGE ROAD I FIRESTONE, CO 80504 I 303.774.3982 I bob.bresnahan@crestonepr.com

CRESTONE PEAK
RESOURCES

3. Crestone will remove all Wells, equipment, and Facilities which Crestone owns from the Site.

4. Prior to the beginning of plugging and abandonment operations the Developer will provide considerations as agreed to in the Agreement.

5. The Agreement will be effective as of execution of the Agreement.

As support for item number four above, estimates for costs to plug and abandon and reclaim the Wells and all five locations on the Site have been provided to Developer for their review.

This letter is not meant to be a binding contract, merely a written expression of mutual interests that outlines some of the terms and conditions that will be drafted into the final Agreement.

In the interim, please do not hesitate to contact us with any questions or concerns.

Sincerely,

Bob Bresnahan
Surface Land Advisor, RPL
Crestone Peak Resources

CRESTONE PEAK
RESOURCES

Town of Erie Board of Trustees
645 Holbrook Street
PO BOX 750
Erie, CO 80516

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In the interim, please do not hesitate to contact us with any questions or concerns.

Sincerely,

Bob Bresnahan
Surface Land Advisor, RPL
Crestone Peak Resources

Jerry B Richmond
Authorized Signatory
Daybreak Recovery Acquisition LLC

AGREEMENT TO PLUG AND ABANDON WELLS AND RECLAIM LANDS

This Agreement to Plug and Abandon Wells And Reclaim Lands ("**Agreement**") is entered into as of 12:00 PM MST on June 17, 2021 ("**Effective Date**"), between Crestone Peak Resources Operating LLC, a Delaware limited liability company, authorized to conduct business in Colorado, whose address is 1801 California St., Ste. 2500, Denver, CO 80202 ("**Crestone**") and, Daybreak Recovery Acquisition LLC whose address is 1166 Avenue of the Americas, 21st Floor, New York, NY 10036 ("**Developer**"). Crestone and Developer are also referred to herein individually as a **"Party"** and collectively as the **"Parties."**

RECITALS

A. WHEREAS, Developer owns the surface estate located in the SE/4, Section 8, Township 1 North, Range 68 West, 6th P.M., Weld County, CO (collectively, "**Lands**");

B. WHEREAS, Crestone owns and operates the following wells (collectively, "**Wells**") on the Lands: (i) the Woolley K Unit 1 Well (API# 05-123-17689); (ii) the Woolley 44-8 Well (API# 05-123-25271); (iii) the Woolley 34-8 Well (API# 05-123-23202); (iv) the Woolley 33-8 Well (API #05-123-21437; and (v) the Woolley 43-8 Well (API# 05-123-22987);

C. WHEREAS, Crestone also owns and operates the Facility pad associated with the Wells with Location ID #249886 ("**Facilities**"), on the Lands, along with the access roads to the same (collectively, **"Location"**);

D. WHEREAS, Crestone is successor in interest to that certain option for relocation of equipment and facilities entered into October 30, 2014 and recorded at Reception Number 4060664 (**"Option"**) on November 12, 2014 in the Clerk and Recorder in Weld County;

E. WHEREAS, Developer currently is planning a housing development on the surface of the Lands ("**Development**");

F. WHEREAS, Developer is currently working with the Town of Erie ("**Town**") to finalize the plans for the Development;

G. WHEREAS, in order to aid in the Development, Developer desires that Crestone release all interest in the Option, plug and abandon the Wells located on the Lands and permanently take the same out of production, and remove the Facilities; and

H. WHEREAS, subject to the terms herein, Crestone desires that Developer reimburse Crestone for the actual costs to plug and abandon the Wells, remove Facilities, and perform all necessary remediation actions.

AGREEMENT

Now, therefore, in consideration of the mutual promises herein, and other good and valuable consideration, the Parties agree as follows:

1. Plugging and Abandonment of the Wells. The plugging and abandonment of the Wells by Crestone shall occur as follows:

1.1 Crestone shall perform the P&A Work and the Crestone Reclamation (both as defined below) within 12 months after receiving: Developer's written request to commence the P&A Work. Developer intends to pursue the following actions prior to Crestone's commencement of the P&A Work, except to the extent the Town requires the P&A Work to be completed prior to the same: (i) approval of the final plats for the Development (**"Final Approval"**) by the Town; and (ii) recording of the Final Approval for the Development in the Weld County, Colorado real property records. Developer shall provide Crestone with an as-recorded copy of the Final Approval within 30 days of the recording of the same.

1.2 The scope of the plugging and abandonment work for the Wells to be performed and completed by Crestone (collectively, "**P&A Work**") shall include, without limitation, all such work, labor and materials as may be necessary to properly plug and abandon the Wells pursuant to the COGCC Rules (as defined below), and in a manner calculated to result in the COGCC's approval of a COGCC Form 6 – Well Abandonment Report for each Well.

1.3 Crestone shall plug and abandon the Wells in accordance with the Rules and Regulations ("**COGCC Rules**") of the Colorado Oil and Gas Conservation Commission ("**COGCC**") in effect on the date on which the P&A Work commences, including without limitation: (i) obtaining a COGCC-approved COGCC Form 6 – Well Abandonment Report for each Well and (ii) timely providing a true and complete copy of the same to Developer. In performing the P&A Work, Crestone shall also comply with all applicable federal, state and local laws, ordinances, orders, rules, regulations, surface use agreements, easements, rights-of-way, use permits and all conditions and restrictions regarding the use of the Lands, the P&A Work and the Wells (collectively, **"Laws"**). Crestone further agrees to handle, store, use or dispose of all Exploration and Production Waste, as defined by COGCC Rules 100 Series, associated with the Location, the P&A Work, and the Wells in compliance with all such applicable Laws. Upon written request by the Developer, Crestone shall provide true and complete copies of any documents and forms filed with any local, state and/or federal governmental agency by Crestone in association with the P&A Work.

1.4 Following completion of the P&A Work, Crestone shall provide Developer and the Town with a COGCC-approved, COGCC Form 6 - Well Abandonment Report for each of the Wells, evidencing the completion of the P&A Work in accordance with applicable Laws and COGCC Rules.

1.5 As part of the P&A Work, and in connection with the Crestone Reclamation (as defined below), Crestone shall remove all equipment, improvements, personal property and/or facilities owned and/or controlled by Crestone located and/or found on the Lands as of the Effective Date and associated with and/or used in connection with the Wells, including but not limited to all tanks, tank batteries, separators, and all other above-ground equipment associated with oil and gas operations, specifically including without limitation all equipment, improvements, personal property and/or facilities required to be removed by the COGCC Rules, applicable Laws, and/or the Town to permit the Development excluding all flowlines (collectively, **"Equipment"**). Crestone shall timely provide Developer with written notification of the completion of its removal

and/or protection of Equipment associated with the Wells. It is expressly understood and agreed by the Parties Crestone will abandon all flowlines between the Wells and Facilities in place per COGCC rules and regulations. Developer shall provide any necessary written variances that are required by the COGCC for abandoning the flowlines in place.

2. Reclamation of Location. The reclamation of the Location shall be jointly conducted by the Parties, pursuant to the COGCC Rules and applicable Laws, as follows:

2.1 Crestone and Developer acknowledge that pursuant to the terms of this Agreement, each Party shall be responsible for the performance of different portions of the reclamation of the Location. Specifically: (i) Crestone shall be responsible for the performance of reclamation as to the Location and Lands, pursuant to the COGCC Rules and all applicable Laws, with respect to the Equipment (EXCLUDING all flowlines, except as provded in Section 1.5 above) and environmental matters (collectively, **"Crestone Reclamation"**) and (ii) Developer shall be responsible for the performance of all other reclamation for the Location, pursuant to the COGCC Rules and all applicable Laws, at Developer's sole cost and expense, subject to the terms of Section 4 herein (**"Developer Reclamation"**). The Crestone Reclamation shall consist of reclamation of the Location, as required by COGCC Rules and applicable Laws, concerning: (i) the completion of the P&A Work; (ii) the removal of Crestone's Equipment (some or all of which may be undertaken in connection with the P&A Work) from the Location; (iii) the conduct of a survey and/or inspection of the Location to determine the presence of any Environmental Law (as defined below) violation and/or concerns, and the remediation of the same; (iv) the testing of Location soils and COGCC Rule certification that the same are equal to or below the concentrations stated in COGCC Rule 910 and COGCC Chart 910-1; and (v) the rendering of the Location fit for performance of Developer Reclamation. For purposes of this Agreement, the term **"Environmental Law"** shall mean any and all federal, state and local statutes, regulations, rules, orders, ordinances or permits of any governmental authority pertaining to health, the environment, wildlife and natural resources in effect in any and all jurisdictions in which the Location is located, including without limitation: (i) the Federal Clean Air Act, as amended; (ii) the Federal Water Pollution Control Act, as amended; (iii) the Federal Oil Pollution Act of 1990, as amended; (iv) the Federal Rivers and Harbors Act of 1899, as amended; (v) the Federal Safe Drinking Water Act, as amended; (vi) the Federal Comprehensive Environmental Response, Compensation and Liability Act, as amended; (vii) the Federal Superfund Amendments and Reauthorization Act of 1986, as amended; (viii) the Federal Resource Conservation and Recovery Act, as amended, the Hazardous and Solid Waste Amendments Act of 1984, as amended, the Toxic Substances Control Act, as amended; the (ix) Federal Occupational Safety and Health Act, as amended; and (x) the Federal Hazardous Materials Transportation Act, as amended.

2.2 Subsequent to the execution of this Agreement by all Parties, the Parties agree to jointly prepare in good faith a written reclamation and flowline abandonment plan concerning the Developer and Crestone Reclamations, as may be required to more fully comply with the COGCC Rules and/or applicable Laws. Developer's responsibilities as set forth in the reclamation and flowline abandonment plan shall not extend beyond removing flowlines from the ground following Crestone's abandonment of such flowlines in place in accordance with COGCC regulations. In performing the Developer and Crestone Reclamations, the Parties shall provide true and complete copies of all documents and forms filed with any local, state and/or federal governmental agency to one another in a reasonably timely manner.

3. Payment. In consideration of Crestone's obligations under this Agreement, Developer shall pay Crestone the total sum of $690,000.00 (Six Hundred Ninety Thousand and no/100) (the "**Payment**"). Developer shall make the Payment to Crestone in three partial amounts as follows: (1) Fifty percent (50%) of the Payment or $345,000 (Three Hundred Forty-Five Thousand and no/100) upon Crestone notifying Developer in writing of its intent to mobilize equipment to the site to perform the P&A work, (2) Twenty-Five percent (25%) of the Payment or $172,500 (One Hundred Seventy-Two Thousand, Five Hundred and no/100) upon Crestone providing photographic evidence to Developer that two of the Wells have been properly capped as required by this Agreement, and (3) the remaining Twenty-Five percent (25%) of the Payment or $172,500 (One Hundred Seventy-Two Thousand, Five Hundred and no/100) upon Crestone providing Developer with a COGCC Form 6 - Well Abandonment Report for each of the Wells. The Payment does not include and Developer is not be responsible for Actual Direct Costs incurred by Crestone to complete the P&A Work for each Well and to complete the Crestone Reclamation. As used herein, **"Actual Direct Costs"** are defined as labor, materials, transportation, insurance and overhead charges properly allocable to the P&A Work, supervision, surveys, permits, rental of tools, equipment and machinery employed on the Lands. The total cost of the P&A Work and Crestone Reclamation is to be at the burden of Crestone.

4. Release of Surface Reclamation. Except as provided for in this Agreement, upon Crestone's full performance of its obligations and duties pursuant to this Agreement, including without limitation Crestone completing the P&A Work and Crestone Reclamation in full compliance with the COGCC regulations and providing Developer with all relevant documentation including without limitation a COGCC Form 6 - Well Abandonment Report for each of the Wells, Developer shall release Crestone from all final surface reclamation responsibilities required by the COGCC Rules. As permitted in COGCC Rule 1001.c, provided Crestone demonstrates to the Director's or the Commission's satisfaction that compliance with Rules 1002, 1003 and 1004 are not necessary to protect the public health, safety and welfare, including prevention of significant adverse environmental impacts, Developer will knowingly and specifically waive all requirements in COGCC Rule 1004 (except 1004.c.4 and 1004.c.5 and as otherwise set forth in this Section 4). Developer, in coordination with Crestone, shall use commercially reasonable efforts (provided such efforts do not require Developer to incur any liability or significant cost) to support Crestone to achieve "final reclamation" as defined by the COGCC Rules. Notwithstanding anything to the contrary contained herein, the Developer Reclamation shall be limited to surface reclamation activities (*e.g.*, compaction, covering, paving, vegetative cover, or other stabilization to minimize erosion); and, for the avoidance of doubt, such Developer Reclamation shall not include removal of debris or otherwise require Developer to be responsible for removal or treatment of Exploration and Production Waste, as defined by COGCC Rules 100 Series, in compliance with COGCC Rules 900 Series rules, including to the extent the same is contemplated by COGCC Rule 1004.b.

4.1 Developer agrees to execute and deliver to Crestone within 2 months of Crestone's satisfactory completion of the P&A Work and the Crestone Reclamation in accordance with the terms of this Agreement, the variance letter detailing the above-referenced waiver and release from final surface reclamation.

5. Real Property Interests. The Parties shall reasonably cooperate in identifying any easements, surface land leases or other real property (specifically excluding any mineral interests) held by Crestone (directly or indirectly) that are associated with the Wells, Lands and/or Location

that are no longer required following the completion of the P&A Work and Crestone Reclamation. Following identification of any such interests, Crestone (and Developer as needed) shall execute one or more documents memorializing Crestone's release and quitclaim of such rights to Developer at no additional cost to Developer. Such documents shall be recorded in the Weld County, Colorado real property records. If any additional interests associated with the Wells, Lands and/or Location that are no longer required following completion of the P&A Work and Crestone Reclamation are subsequently identified, the Parties shall reasonably cooperate in executing such other additional documents memorializing Crestone's release and quitclaim of such rights, again, at no additional cost to Developer.

5.1 Upon execution of this Agreement and Developer making the first payment as described in Section 3 above, Crestone and Developer shall execute the attached Exhibit A release and quitclaim agreement of the Option.

6. Liability. Crestone shall be solely responsible for the acts and omissions of Crestone's agents, representatives, employees, contractors, subcontractors, and other persons performing the P&A Work and/or Crestone Reclamation under this Agreement, and Developer shall have no liability for, and is hereby released by Crestone for liability for all claims (including regulatory agency claims), causes of action, losses, fines, penalties, damages, costs and expenses resulting, directly or indirectly, from Crestone performing or causing the performance of the P&A Work and/or the Crestone Reclamation. Developer shall be solely responsible for the acts and omissions of Developer's agents, representatives, employees, contractors, subcontractors, and other persons performing the Developer Reclamation under this Agreement, and Crestone shall have no liability for, and is hereby released by Developer for liability for all claims (including regulatory agency claims), causes of action, losses, fines, penalties, damages, costs and expenses resulting, directly or indirectly, from Developer performing or causing the performance of the Developer Reclamation.

7. Indemnification. Crestone shall protect, indemnify, defend and hold harmless Developer and Developer's respective directors, officers, members, employees, representatives and agents from and against any and all claims (including regulatory agency claims), causes of action, losses, fines, penalties, damages, costs and expenses resulting, directly or indirectly, from Crestone performing or causing the performance of the P&A Work and/or the Crestone Reclamation. Developer shall protect, indemnify, defend and hold harmless Crestone and Crestone's respective directors, officers, members, employees, representatives and agents from and against any and all claims (including regulatory agency claims), causes of action, losses, fines, penalties, damages, costs and expenses resulting, directly or indirectly, from Developer performing or causing the performance of the Developer Reclamation.

8. Governing Law. Colorado law, without giving effect to its conflict-of-laws principles, governs all matters arising out of this Agreement, including torts.

9. Counterparts. The parties may execute this Agreement in counterparts, each of which is an original, and all of which constitute only one agreement between the parties.

10. Notice. All notices required or which may be given in accordance with this Agreement are considered properly given if delivered via email and/or writing, personally, or sent by certified United States mail, postage prepaid, addressed as follows:

Crestone Peak Resources Operating, LLC
Attn: Surface Land
1801 California St, Suite 2500
Denver, CO 80202
Email: bob.bresnahan@crestonepr.com

Daybreak Recovery Acquisition LLC
1166 Avenue of the Americas, 21st Floor
New York, NY 10036
Email: jshumaker@crosslakepartners.com

11. Severability. If any part of this Agreement is for any reason found to be invalid or unenforceable, the remaining provision remain in force.

12. Binding. This Agreement, and the duties, obligations and rights of the Parties herein, is a covenant that runs with the land, and is binding upon successors, heirs, and assigns of the parties.

13. Assignment. Neither party shall assign or transfer this Agreement or any interest herein without the prior written consent of the other party, except as otherwise set forth herein, which consent shall not be unreasonably withheld. Either party shall have the right to assign or transfer this Agreement or any interest herein without the consent of the other party if such assignment or transfer is to an entity controlling, controlled by or under common control with the assigning party. Notwithstanding the above, upon written notice to Crestone, Developer may assign or transfer this Agreement to any purchaser of the Lands without the consent of Crestone.

14. Other Rights. This Agreement is for the purpose of clarifying plugging and abandonment and reclamation responsibilities and the release of the Option. This Agreement does not waive any other right Crestone has under any other agreement pertaining to this property.

[signature page follows]

IN WITNESS WHEREOF, the parties hereto have executed this Agreement effective as of the date first written above.

DEVELOPER:

Daybreak Recovery Acquisition LLC

By: _____
Name: Jon Shumaker
Title: Authorized Signatory

CRESTONE:

CRESTONE PEAK RESOURCES OPERATING LLC

By: _____
Name: Shea Kauffman
Title: VP, Land

EXHIBIT A

TERMINATION AND RELEASE OF

SURFACE USE AGREEMENTS

This Termination and Release of Surface Use Agreements (this "**Termination**") is made this _____ day of May, 2021 (the "**Termination Date**"), by and between Daybreak Recovery Acquisition LLC whose address is 1250 Avenue of the Americas, 50th Floor, New York, NY 10020 ("**Developer**"), and Crestone Peak Resources Holdings LLC, a Delaware limited liability company ("**Crestone**"), with a principal mailing address of 1801 California Street Suite 2500 Denver, Colorado 80202. Owner and Crestone are herein collectively referred to as the "**Parties**."

RECITALS:

A. WHEREAS, Developer owns the surface estate located in the SE/4, Section 8, Township 1 North, Range 68 West, 6th P.M., Weld County, CO ("**Lands**")

B. WHEREAS, pursuant to the terms of that certain unrecorded Surface Damage and Release Agreement dated effective May 5, 2005 ("**Agreement 1**"), by and between Developer's predecessor in interest Tallgrass Investor's LLC, a Colorado limited liability company ("**Tallgrass**"), and Crestone's predecessor in interest, Encana Oil & Gas (USA) Inc., a Delaware corporation ("**Encana**"), Tallgrass and Encana agreed to the use of the surface of, development of, and oil and gas operations on, the Lands.

C. WHEREAS, pursuant to the terms of that certain recorded Surface Use Agreement dated effective September 27, 2011, recorded in Weld County Clerk and Recorders Office ("**Office**") on October 18, 2011, at Reception No. 3799568 ("**Agreement 2**"), by and between Tallgrass and Encana, Tallgrass and Encana agreed to the use of the surface of, development of, and oil and gas operations on, the Lands.

D. WHEREAS, pursuant to the terms of that certain unrecorded Surface Use Agreement dated effective July 30, 2003 ("**Agreement 3**"), by and between Tallgrass and Crestone's predecessors in interest, Anadarko Land Corporation and Anadarko E & P Company L.P. (collectively "**Anadarko**")and Encana Energy Resources Inc. (ECER), Tallgrass, ECER, and Anadarko agreed to the use of the surface of, development of, and oil and gas operations on, the Lands.

E. WHEREAS, pursuant to the terms of that certain unrecorded Surface Use Agreement dated effective August 26, 2005 ("**Agreement 4**"), by and between Tallgrass and Encana, Tallgrass and Encana agreed to the use of the surface of, development of, and oil and gas operations on, the Lands.

F. WHEREAS, In order to evidence Agreement 1 and to provide public notice thereof, Tallgrass and Encana entered into that certain Memorandum of Surface Damage and Release Agreement dated effective May 5, 2005, and recorded August 25, 2005, at Reception No. 3316658 (together with its unrecorded Amendment), which was

subsequently corrected pursuant to that certain Corrected Memorandum of Surface Damage and Release Agreement recorded November 1, 2010, at Reception No.3729056, in the Office (collectively the "**Memorandum of Agreement 1**").

G. WHEREAS, In order to evidence Agreement 3 and to provide public notice thereof, Tallgrass ECER entered into that certain Memorandum of Surface Use Agreement recorded September 26, 2003, at Reception No. 3110572, in the Office (the "**Memorandum of Agreement 3**").

H. WHEREAS, In order to evidence Agreement 4 and to provide public notice thereof, Tallgrass and Encana entered into that certain Memorandum of Surface Use Agreement recorded March 13, 2007, at Reception No. 3461612, which was subsequently corrected pursuant to that certain Corrected Memorandum of Surface Use Agreement recorded November 1, 2010, at Reception No.3729057, in the Office, along with its unrecorded Amendment (collectively the "**Memorandum of Agreement 4**").

I. WHEREAS, pursuant to the terms of that certain Agreement for Compatible Development dated effective November 14, 2000, and recorded November 17, 2000, at Reception No. 2807515 in the Office ("**Compatible Agreement**"), by and between Developer's predecessor in interest Weld County Land Company, LLC ("**Weld**"), and Crestone's predecessor in interest, Union Pacific Resources Company and Union Pacific Land and Resources Corporation (collectively "**UP**"), Weld and UP agreed to cooperate with respect to the development of oil and gas operations on, the Lands.

J. Crestone is successor in interest to that certain option for relocation of equipment and facilities between Developer and Encana dated effective of October 30, 2014, and recorded on November 12, 2014, at Reception Number 4060664 (**"Option"**) in the Office.

K. Crestone assumed all of Encana's and ECER's rights and obligations under Agreement 1, Agreement 2, Agreement 3, Agreement 4 and the Option prior to the Termination Date.

L. Crestone assumed all of Anadarko's rights and obligations under the Agreement 3 prior to the Termination Date

M. Crestone assumed all of UP's rights and obligations under the Compatible Agreement related to the Lands prior to the Termination Date

N. The Parties desire to terminate Agreement 1, Agreement 2, Agreement 3, Agreement 4, the Memorandum of Agreement 1, the Memorandum of Agreement 3, the Memorandum of Agreement 4, the Compatible Agreement with respect to the Lands only and the Option (collectively, **"The Agreements"**) and to release all rights and obligations of each of them under The Agreements pursuant to the terms, covenants, and conditions set forth in this Termination.

NOW, THEREFORE, in consideration of the above premises, the mutual covenants and agreements hereinafter set forth and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

1. **Termination**. The Agreements are each hereby terminated and shall have no further force or effect, except as to such covenants, indemnifications and other agreements of the Parties as may expressly survive termination of The Agreements.

2. **Release**. Developer, on behalf of itself and its current and former officers, managers, members, principals, directors, agents, employees, representatives, predecessors, and successors and assigns hereby releases Crestone, its affiliates, shareholders, officers, directors, principals, agents, partners, members, employees, representatives, predecessors, and successors and assigns from any and all claims, demands, obligations, actions, liabilities, defenses, or damages of every kind and nature whatsoever, in law or in equity, whether known or unknown, arising prior to and through and including the Termination Date, including, without limitation, any and all claims arising under federal, state, or local law.

3. **Release**. Crestone, on behalf of itself and its current and former officers, managers, members, principals, directors, agents, employees, representatives, predecessors, and successors and assigns hereby releases Developer, its affiliates, shareholders, officers, directors, principals, agents, partners, members, employees, representatives, predecessors, and successors and assigns from any and all claims, demands, obligations, actions, liabilities, defenses, or damages of every kind and nature whatsoever, in law or in equity, whether known or unknown, arising prior to and through and including the Termination Date, including, without limitation, any and all claims arising under federal, state, or local law.

4. **Binding Agreement**. This Termination shall be binding upon and shall inure to the benefit of the Parties and their respective successors, transferees and assigns.

5. **Miscellaneous**. This Termination may be executed in counterparts, each of which will be deemed an original document, but all of which together will constitute a single document.

[Signatures appear on following page]

IN WITNESS WHEREOF, Developer and Crestone have each caused this Termination And Release Of Surface Use Agreements to be duly executed by its authorized representative the day and year first above written.

OWNER:

Daybreak Recovery Acquisition LLC

By:_____

Name: _____

Title: _____

STATE OF _____)

) ss.

COUNTY OF _____)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that he signed this instrument, on oath stated that he was authorized to execute the instrument and acknowledged it as an authorized signatory of Daybreak Recovery Acquisition LLC, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument, executed this ____ day of _____, 2021.

_____

Printed Name: _____

My Commission Expires:

CRESTONE:

Crestone Peak Resources Holdings LLC,
a Delaware limited liability company

By:_____

Name: Shea Kauffman

Title: VP, Land

STATE OF _____)

) ss.

COUNTY OF _____)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that he signed this instrument, on oath stated that he was authorized to execute the instrument and acknowledged it as an authorized signatory of CRESTONE PEAK RESOURCES HOLDINGS LLC, a Delaware limited liability company, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument, executed this ____ day of _____, 2021.

_____

Printed Name: _____

My Commission Expires:

515

2807515 11/17/2000 09:32A JA Suki Tsukamoto
1 of 28 R 140.00 D 0.00 Weld County CO

AGREEMENT FOR COMPATIBLE DEVELOPMENT

THIS AGREEMENT FOR COMPATIBLE DEVELOPMENT is made and entered into this 14th day of November, 2000, among UNION PACIFIC RESOURCES COMPANY, a Delaware corporation ("UPRC"), and UNION PACIFIC LAND RESOURCES CORPORATION, a Nebraska corporation ("UPLRC"), both with an address for business of P.O. Box 1330, Houston, Texas 77251-1330 and referred to hereinafter alone or together, as appropriate, as the "UP Entities" and WELD COUNTY LAND COMPANY, LLC, a Colorado limited liability company, with an address for business of 2500 Arapahoe, Suite 220, Boulder, Colorado 80302 ("Developer").

RECITALS

A. Community Development Group of Erie, LLC ("CDG") and UPLRC have entered into an Offer to Purchase and Agreement of Sale ("Sales Agreement") that covers the sale by UPLRC to CDG of portions of the surface estate and certain mineral interests in Weld County, Colorado, for the property that is described in Exhibit "A" hereto (the "Property").

B. CDG has assigned all of its interests in the Sales Agreement to Developer.

C. Developer intends to purchase the Property in order to develop the surface in the future.

D. The UP Entities, or either of them, own and will reserve to themselves the oil and gas estate for the Property in any deed or deeds issued pursuant to the Sales Agreement.

E. The UP Entities, as owners of the oil and gas estate, or other companies or entities pursuant to oil and gas leases or other agreements or assignments, have the right to explore for and develop the oil and gas under the Property.

F. Oil and gas well sites and production sites and access roads and pipelines currently are located on the Property.

G. Current Colorado Oil and Gas Conservation Commission ("COGCC") rules and regulations would allow the owners and/or lessees of the oil and gas for the Property to locate drillsites, one each in approximately the center of each quarter section and one in the center of each quarter quarter section.

H. The parties enter into this Agreement for Compatible Development ("Agreement") to provide for the coexistence and joint development of the surface estate and the oil and gas estate and to delineate the process with which the parties shall comply with respect to the development of the two estates.

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NOW, THEREFORE, in consideration of the covenants and the mutual promises set forth in the Sales Agreement and in this Agreement, including the representations set forth in the recitals, the parties agree as follows:

1. THIS AGREEMENT SUPERCEDES EARLIER AGREEMENT.

This Agreement supercedes and replaces in its entirety the Agreement for Compatible Development dated September 18, 1998 among UPLRC, UPRC, and CDG.

2. DEFINITIONS.

(a) Application for Development includes a proposed subdivision plat, a planned unit development, a special use permit application, an application for a preliminary or final plat or plan, or any other designation for a surface development application used by a local jurisdiction, and any annexation request and any application for zoning or rezoning.

(b) Oil and Gas Interest Owners include the UP Entities and the lessees identified in oil and gas leases which have been recorded in the land records of Weld County, Colorado, or the assignees of recorded oil and gas leases where a notice of the assignment has been recorded in the land records of Weld County, Colorado and any other person or entity which a UP Entity identifies in writing to Developer as having an interest in the Property.

(c) Oil and Gas Well Operator means any individual or entity which operates an oil and gas well or other oil and gas facility on a Production Site or Well Site and whose identity, address, and phone number is displayed on a sign situated at the Well Site or Production Site.

(d) Applicable Oil and Gas Interest Owners refers to those Oil and Gas Interest Owners who have an interest in the parcel of property that is the subject of an Application for Development.

(e) Oil and Gas includes all oil, gas and associated liquid hydrocarbons, coal gas, coalbed methane, nitrogen, carbon dioxide, helium and all other natural gases.

(f) Production Site means that area surrounding proposed or existing production pits or other accessory equipment required in oil and gas production, at which may also be located tanks and tank batteries, exclusive of transmission and gathering pipelines.

(g) Proposed Production Site or Well Site means a site that is set aside as a future location pursuant to Section 4.

(h) Surface Use Agreement means a surface use agreement referred to herein to be entered into between Developer and the applicable Oil and Gas Interest Owners.

(i) Well Site means that area surrounding a proposed or existing well or wells and accessory structures and equipment necessary for drilling, completion, recompletion, workover, development and production activities.

3. EXISTING WELL SITE AND PRODUCTION SITE LOCATIONS. The following terms shall apply to all Well Sites and Production Sites that are in existence at the time Developer files an Application for Development:

(a) Lot lines for surface development shall be platted no closer than 200 feet from wellheads and from oil and gas facilities, including tank batteries, meter stations and separators, or any greater distance as is required by local regulations.

(b) Oil and Gas Interest Owners may continue to use their historic access to existing Well Sites and Production Sites and other oil and gas facilities and their historic easements for pipelines; provided, however, Developer and the operator of a Well Site or Production Site or pipeline may mutually agree upon alternate access routes and pipeline easements, all costs and expenses of relocations to be borne by Developer.

(c) Developer shall give advance notice to and meet at the site with representatives of the Oil and Gas Well Operator or the affected Oil and Gas Interest Owners to locate existing pipelines and to coordinate proposed surface construction activities with current and prospective oil and gas operations.

4. PROPOSED WELL SITE AND PRODUCTION SITE LOCATIONS. The following terms shall apply to proposed Production Sites and Well Sites:

(a) Prior to the approval of an Application for Development, other than for annexation and rezoning requests, Developer shall use its best efforts to meet with the applicable Oil and Gas Interest Owners to agree upon the number and location of future Well Site and Production Site locations to be installed on the Property. In the event an agreement is reached, the parties shall enter into a Surface Use Agreement specific to the parcel to be developed. In the event Developer and the applicable Oil and Gas Interest Owners cannot reach an agreement upon the number and location of future Well Sites and Production Sites or on the terms of a Surface Use Agreement, Developer shall, in connection with its Application for Development, include proposed Production Sites and Well Sites in the center of each quarter section and in the center of each quarter quarter section that conform to the locations identified in COGCC Rule 318A.a (1) and (2), a copy of which is attached to this Agreement as Exhibit B; provided, however, the size of the Well Sites and Production Sites shall conform to the description in Subsection 4.(b)(i).

(b) In locating Well Sites and Production Sites, access and pipeline easements, the parties shall include in the Surface Use Agreement, or if no Surface Use Agreement is entered

into, Developer shall, in providing for such proposed Production Sites and Well Sites, provide at a minimum, as follows:

(i) Each location shall include at least enough acreage to equal either approximately a square of four acres or a circle with a diameter of 467 feet, which acreage shall be reserved exclusively for oil and gas operations, so that surface property lines may abut, but may not be included within such acreage.

(ii) More than one well with attendant facilities may be located at both existing and proposed Well Sites and Production Sites subject to COGCC rules and regulations.

(iii) Routes to access each Well Site And Production Site and the location of pipeline easements shall be identified.

(iv) Subject to clause 4(b)(i), sufficient setbacks between buildings, building units and lot lines and Well Sites and Production Sites or wellheads and production facilities shall be provided to allow the Oil and Gas Interest Owners to comply with local setback regulations to drill a well and to conduct subsequent oil and gas operations.

5. IMPACT MITIGATION. Developer shall bear all costs to install such noise and visual impact mitigation measures it desires or the local jurisdiction or Weld County requires at or around existing and proposed Well Sites and Production Sites which are in excess of or in addition to those measures which are required by COGCC regulations for areas which are not high density; provided, however, the operator of the Well Site or Production Site shall have reasonable discretion to veto or protest the types and location of impact mitigation measures in order to allow for safe oil and gas operations. To the extent required by law or regulation, the UP Entities shall bear the cost of other impact mitigation measures, including environmental or hazardous materials cleanup, remediation or mitigation for any of its operations on the Property.

6. ACCESS AND PIPELINE EASEMENTS. All existing and future access roads and pipeline easements shall comply, at a minimum, as follow:

(a) Roads used for access shall be at least thirty (30) feet in width .

(b) Developer shall keep access that is jointly used by both surface occupants and the public and the Oil and Gas Interest Owners in good condition and repair once Developer has commenced development of the applicable parcel and until they are dedicated to a local jurisdiction. With respect to any roads that are jointly used by both the surface owner and the UP entities which are damaged as a result of actions or use by the UP entities or Developer, the cost of such repair of such damage shall be paid by the party causing the damage.

(c) Neither the UP Entities nor Developer shall unreasonably interfere with the use by the other of access roads.

(d) All pipeline easements shall be fifty (50) feet in width during construction, and thirty (30) feet in width during operations, transportation and maintenance activities. Developer shall grant the pipeline easements (for production from the property and other lands) to the Oil and Gas Interest Owners at the time they request them. It is the intention of the parties that pipeline easements be located in the most reasonably direct routes and, to the extent practicable, within dedicated rights-of-way and open space areas.

(e) Oil and Gas Interest Owners may install one or more pipelines within the easements.

7. PLAT AND LOCAL APPLICATIONS. Developer shall identify on plats and in Applications for Development (other than for annexation and rezoning requests) the locations and size of all existing and proposed Well Sites and Production Sites and other oil and gas facilities and existing and future access roads and pipeline easements, as well as the setbacks between existing and proposed Well Sites and Production Sites and planned and existing lot lines. Developer shall record a plat or other Application for Development which reflects the foregoing in the office of the Clerk and Recorder of Weld County after it is approved by the local jurisdiction.

8. NOTICE OF HEARINGS. Developer shall provide to each applicable Oil and Gas Interest Owner and Oil and Gas Well Operators written notice fifteen (15) days before each hearing on an Application for Development which affects such Oil and Gas Interest Owner's property.

9. WAIVER OF CERTAIN REQUIREMENTS AND OBJECTIONS. Developer hereby waives state and local setback regulations and other requirements that are inconsistent with this Agreement or a Surface Use Agreement and also agrees to not object in any forum to the use by Oil and Gas Interest Owners of the surface of the Property consistent with this Agreement or a Surface Use Agreement. At the request of an Oil and Gas Interest Owner, Developer shall provide such other written approvals and waivers which are reasonably requested and consistent with this Agreement or an applicable Surface Use Agreement, including, but not limited to, all approvals and waivers to drill a well or to conduct oil and gas operations on the Property because of any law or regulation, including any local ordinance and regulations of the COGCC and including, for example, waivers to the setback requirements in the current COGCC Rule 603, if applicable, or any successor state or local setback regulation and to any state setback requirement from a surface property line or for an exception location request.

10. COMPLIANCE WITH RULES AND REGULATIONS. Except as may be otherwise provided in Section 9, Developer and the UP Entities agree to comply with all valid and applicable federal, state and local regulations that pertain to the development of the surface estate and the exploration and development of Oil and Gas on the Property. The UP Entities shall make reasonable efforts to persuade Oil and Gas Interest Owners to enter into Surface Use Agreements with Developer.

11. NO OBJECTION TO DEVELOPMENT. The UP Entities agree that they will not object to a request by Developer to annex, rezone, plat or replat all or any portion of the Property to the extent such request is consistent with the use by the Oil and Gas Interest Owners of the surface of the Property in the manner identified in this Agreement and any applicable Surface Use Agreement; provided, however, neither of the UP Entities shall be required to incur any expenses in connection with such request.

12. UPRC OR UPLRC A PARTY TO SURFACE USE AGREEMENTS. UPRC or UPLRC shall be a party to each Surface Use Agreement that is entered into between Developer and other applicable Oil and Gas Interest Owners.

13. OIL AND GAS INTEREST OWNERS WHICH ARE KNOWN TO THE UP ENTITIES. Attached as Exhibit C is a list of those entities which the UP Entities believe own a leasehold or other Oil and Gas interest in the Property as of the date of this Agreement. The Developer may not rely on this list, and is required to perform an independent investigation as provided in Section 2(b) and provide notice to the applicable Oil and Gas Interest Owners and Oil and Gas Well Operators.

14. WAIVER OF SURFACE DAMAGE PAYMENTS. In the event that Developer and the applicable Oil and Gas Interest Owners do not enter into a Surface Use Agreement and Developer is required under Section 4(a) to preserve drillsite locations at the locations identified in COGCC Rules 318A ("Legal Locations"), Developer hereby agrees to waive all surface damage payments for each and every well that is drilled at a Legal Location. Oil and Gas Interest Owners may provide a copy of this Agreement to the COGCC as evidence of this waiver. The term "surface damage payments" as used herein shall be given the meaning commonly used in the oil and gas industry.

15. ACKNOWLEDGMENT OF TITLE TO THE OIL AND GAS. As between the parties, Developer specifically acknowledges the title of the UP Entities to the Oil and Gas reserved and relinquishes all rights and claims thereto.

16. SURFACE OWNER CONSENT. Developer, for itself and its successors and assigns, agrees that it will not withhold its consent as surface owner of the Property (if the UP Entities, in their sole discretion, require such consent) to the exercise by the Oil and Gas Interest

Owners of their rights to explore for and develop the Oil and Gas under the Property in accordance with this Agreement or any applicable Surface Use Agreement and all applicable laws and regulations.

17. CONFLICT IN AGREEMENTS. In the event of a conflict between this Agreement and a Surface Use Agreement, the terms of the Surface Use Agreement shall control. The provisions in a Surface Use Agreement shall supersede any inconsistent provisions in this Agreement.

18. OIL AND GAS INTEREST OWNERS ARE BENEFICIARIES. The benefits of the terms of this Agreement shall extend to the Oil and Gas Interest Owners, and any of them may bring an action directly against Developer for damages or injuries sustained resulting from a breach of this Agreement by Developer; however, nothing in this Agreement is intended to create a cause of action by any Oil and Gas Interest Owner against either of the UP Entities or to enlarge any right or interest created by any agreement or lease between a UP Entity and an Oil and Gas Interest Owner.

19. RIGHTS OF OIL AND GAS LESSEES AND THEIR ASSIGNEES. Developer understands and acknowledges that the UP Entities, or either of them, have entered into leases and agreements with various entities for portions of the Property and that the UP Entities have granted their lessees the exclusive right to explore for and develop the Oil and Gas that underlies the property that is the subject of a lease. Developer further recognizes that the UP Entities enter into this Agreement in their capacity as the owners of the Oil and Gas and to protect their reversionary interest to explore for and develop the Oil and Gas at such time as a lease terminates. In this regard, Developer is aware that the applicable Oil and Gas lessees or their assignees have rights to explore for and develop the Oil and Gas that are not affected by this Agreement.

20. NO LIMITATION ON RIGHTS. Except as provided herein with respect to the Oil and Gas Interests of the UP Entities only, nothing in this Agreement is intended to limit the rights of the Oil and Gas Interest Owners under the terms of their oil and gas leases and pursuant to state law.

21. SUCCESSORS AND ASSIGNS. This Agreement and all of the covenants in it shall be binding upon the personal representatives, heirs, successors and assigns of all of the parties, and the benefits of this Agreement shall inure to their personal representatives, heirs, successors and assigns; provided, however, this Agreement is not intended to bind Oil and Gas Interest Owners other than the UP Entities and reference herein to the obligations of one or both of the UP entities is strictly limited to such entities. This Agreement and all of the covenants in it shall be covenants running with the land.

22. RECORDING. This Agreement shall be recorded with the Clerk and Recorder of Weld County at any time after Developer closes on the sale of all or any portion of the Property.

23. APPLICABILITY TO PROPERTY PURCHASED BY DEVELOPER. This Agreement shall apply only to that portion of the Property that Developer purchases.

24. GOVERNING LAW. The validity, interpretation and performance of this Agreement shall be governed and construed in accordance with the laws of the State of Colorado.

25. SEVERABILITY. If any part of this Agreement is found to be in conflict with applicable laws, such part shall be inoperative, null and void insofar as it conflicts with such laws; however, the remainder of this Agreement shall be in full force and effect. In the event that any part of this Agreement would otherwise be unenforceable or in conflict with applicable laws due to the term or period for which such part is in effect, the term or period for which such part of this Agreement shall be in effect shall be limited to the longest period allowable which does not cause such part to be unenforceable or in conflict with applicable laws.

26. NOTICES. Any notice or communication required or permitted by this Agreement shall be given in writing either by (a) personal delivery; (b) expedited delivery service with proof of delivery; (c) United States mail, postage prepaid, and registered or certified mail with return receipt requested; or (d) prepaid telecopy or fax, the receipt of which shall be acknowledged, addressed as follows:

UP Entities: Union Pacific Resources Company
c/o Anadarko Petroleum Corporation
Attention: Manager Western U.S. Land
P.O. Box 1330
17001 North Chase Drive
Houston, Texas 77251-1330

Developer: Weld County Land Company, LLC
2500 Arapahoe, Suite 220
Boulder, Colorado 80302
Attention: Jon Lee

with a copy to: Alan Lottner, Esq.
Lottner Rubin Fishman Brown & Saul, P.C.
633 17th Street, Suite 2700
Denver, Colorado 80202-3635

27. INCORPORATION BY REFERENCE. Exhibits A and B, and C are incorporated herein by this reference.

28. COUNTERPART EXECUTIONS. This Agreement may be executed in counterparts, each of which shall be deemed an original.

29. ENTIRE AGREEMENT. This Agreement sets forth the entire understanding among the parties and supersedes any previous communications, representations or agreements, whether oral or written. No change of any of the terms or conditions herein shall be valid or binding on any party unless in writing and signed by an authorized representative of each party.

IN WITNESS WHEREOF, the undersigned parties have caused this Agreement to be executed by a duly authorized representative on the date and year first above written.

UP ENTITIES:

UNION PACIFIC RESOURCES COMPANY,
a Delaware corporation

By: _____ mdj
Its: Attorney-In-Fact

UNION PACIFIC LAND RESOURCES CORPORATION, a Nebraska corporation

By: _____ mdj
Its: Attorney-in-Fact

DEVELOPER:

WELD COUNTY LAND COMPANY, LLC,
a Colorado limited liability company

By: _____
Its: MANAGER

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STATE OF COLORADO)
CITY AND) ss.
COUNTY OF DENVER)

The foregoing instrument was acknowledged before me this 14th day of November, 2000, by G. E. Peters, as Attorney-in-Fact of Union Pacific Land Resources Corporation, a Nebraska corporation.

WITNESS my hand and official seal.

My Commission expires: 8/29/01

Melissa A. Morman
Notary Public

STATE OF COLORADO)
CITY AND) ss.
COUNTY of DENVER)

The foregoing instrument was acknowledged before me this 14th day of November, 2000, by James L. Newcomb, as Attorney-in-Fact of Union Pacific Resources Company, a Delaware corporation.

WITNESS my hand and official seal.

My Commission expires: 8/29/01

Melissa A. Morman
Notary Public

STATE OF COLORADO)
CITY AND) ss.
COUNTY of DENVER)

The foregoing instrument was acknowledged before me this 14th day of November, 2000, by Charles R. Bullock, as Manager of Weld County Land Company, LLC, a Colorado limited liability company.

WITNESS my hand and official seal.

My Commission expires: 8/29/01

Melissa A. Morman
Notary Public

EXHIBIT A

Attached to and made part of Agreement for Compatible Development
dated November 14, 2000, by and among
UNION PACIFIC LAND RESOURCES CORPORATION,
UNION PACIFIC RESOURCES COMPANY, and
WELD COUNTY LAND COMPANY, LLC

A parcel of land situate in Section 4, Township 1 North, Range 68 West of the 6th P.M., Weld County, more particularly described as follows:

PARCEL A

Commencing at the Southwest corner of Section 4, Township 1 North, Range 68 West, 6th P.M., from whence the West 1/4 corner of said Section lies N00°02'03" E, 2682.02 feet;
Thence N44°47'52" E, 42.60 feet to the point of beginning, 30.00 feet easterly of the West line of the SW1/4 of Section 4;
Thence N00°02'03" E, 2651.78 feet parallel with and 30.00 feet East of West line of the SW1/4 of Section 4;
Thence N00°01'00" E, 2418.32 feet parallel with and 30.00 feet East of the West line of the NW1/4 of Section 4 to a point on the South right-of-way line of State Highway 52 recorded in Book 491, Reception No. 1413164 and along said right of way the following two courses:

1. N55°55'30" E, 60.40 feet;
2. N88°34'43" E, 5153.37 feet, to a point 30.00 feet westerly of the East line of the NE1/4 of Section 4;

Thence S00°05'46" E, 2568.01 feet parallel with and 30.00 feet West of the East line of the NE1/4 of Section 4;
Thence S00°08'21" E, 2632.37 feet parallel with and 30.00 feet West of the East line of the SE1/4 of Section 4 to a point 30.00 feet northerly of the South line of the SE1/4 of Section 4;
Thence S89°44'56" W, 2608.67 feet parallel with and 30.00 feet North of the South line of the SE1/4 of Section 4;
Thence S89°33'41" W, 2606.23 feet parallel with and 30.00 feet North of the South line of the SW1/4 of Section 4 to the point of beginning.

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Two parcels of land situate in the SE1/4 of Section 8, Township 1 North, Range 68 West o the 6th P.M., Weld County, more particularly described as follows:

PARCEL B

Commencing at the Southeast corner of Section 8, Township 1 North, Range 68 West, 6th P.M., from whence the East 1/4 corner of said section lies N00°49'09" E, 2674.68 feet; Thence N45°04'48" W, 41.78 feet to the point of beginning, 30.00 feet North of the South line of said section;
Thence S89°01'14" W, 2618.83 feet parallel with and 30.00 feet North of the South line o said section to a point on the North-South centerline of Section 8;
Thence N00°01'31" E, 1579.23 feet along said North-South centerline to a point on the South right of way line of the Union Pacific Railroad, said right-of-way conveyed to the Union Pacific Railroad by a deed recorded June 13, 1912, in Book 359 at Page 418, said right-of-way line being 50.00 feet distant southerly as measured at right angles or radially from the existing main track centerline;
Thence along said right of way the following three courses:

1) N42°43'40" E, 467.34 feet,
2) 1735.43 feet along the arc of a tangent curve to the right, said arc subtended by a radius of 1858.50 feet, a central angle of 53°30'06", and a chord bearing N69°28'43" E, 1673.07 feet,
3) S83°46'14" E, 772.36 feet to a point 30.00 feet West of the East line of the S1/2 of the section;

Thence S00°49'09" W, 2380.71 feet parallel with and 30.00 feet West of the East line of the S1/2 to the point of beginning.

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PARCEL B-1

Commencing at the East 1/4 corner of Section 8, Township 1 North, Range 68 West, 6th P.M. from whence the Southeast corner of said section lies S00°49'09" W, 2674.68 feet;
Thence along the East-West centerline S89°35'35" W, 30.00 feet to the point of beginning;
Thence S00°49'09" W, 163.81 feet parallel with and 30.00 feet West of the East line of th S1/2 of Section 8 to a point on the northerly right-of-way line of the Union Pacific Railroad, said right of way conveyed to the Union Pacific Railroad by a deed recorded Jun 13, 1912, in Book 359 at Page 418, said right-of-way line being 50.00 feet distant northerly as measured at right angles or radially from the existing main track centerline;
Thence following said northerly right of way the following three courses:
1) N83°46'14" W, 762.89 feet,
2) 1828.81 feet along the arc of a tangent curve to the left, said arc subtended by a radius of 1958.50 feet, a central angle of 53°30'06", and a chord bearing S69°28'43" W, 1763.09 feet;
3) S42°43'40" W, 358.98 feet to a point on the North-South centerline of Section 8;
Thence N00°01'31" E, 943.91 feet along said North-South centerline to a point on the East-West centerline of said Section 8;
Thence N89°35'35" E, 2655.15 feet along the East-West centerline to the point of beginning.

(continued)

Three parcels of land situate in Section 10, Township 1 North, Range 68 West of the 6th P.M., Weld County, more particularly described as follows:

PARCEL C

Commencing at the Northwest corner of Section 10, Township 1 North, Range 68 West, 6th P.M., from whence the West 1/4 corner of said section lies S00°24'43" W, 2669.01 feet;
Thence N89°45'35" E, 30.00 feet;
Thence S00°08'14" E, 30.00 feet to the point of beginning;
Thence parallel with and 30.00 feet South of the North line of the NW1/4 of Section 10 N89°45'35" E, 2627.62 feet to a point on the West line of said NE1/4;
Thence parallel with and 30.00 feet South of the North line of the NE1/4 of Section 10 N89°45'48" E, 2408.00 feet to a point on the West right-of-way line of Interstate Highway 25, as recorded in Book 1513 at Page 241;
Thence along said West right-of-way line the following two courses:
1) S00°23'52" E, 2628.85 feet;
2) S00°22'56" E, 2628.28 feet to a point 30.00 feet northerly of the South line of the SE1/4 of Section 10;
Thence parallel with and 30.00 feet North of said South line S89°37'55" W, 2446.01 feet to a point on the West line of SE1/4 of Section 10;
Thence parallel with and 30.00 feet North of the South line of the SW1/4 of Section 10 S89°43'33" W, 844.10 feet to a point on the northeasterly line of a parcel recorded in Book 359 at Page 418, being 50.00 feet northeasterly, as measured radially, from the centerline of the main track of the Boulder branch of the Union Pacific Railroad as now constructed and operated;

Thence along said line the following two courses:
1) 969.82 feet along the arc of a non-tangent curve to the left, said arc subtended by a radius of 2857.50 feet, a central angle of 19°26'45", and a chord bearing N57°09'36" W, 965.16 feet;
2) N66°52'58" W, 372.83 feet to a point on the southerly line of a parcel recorded in Book 847 at Page 316 and described as "60 feet in width and eight tenths (0.8) of an acre";
Thence along said line the following twelve courses:
1) 239.36 feet along the arc of a tangent curve to the left, said arc subtended by a radius of 974.72 feet, a central angle of 14°04'55", and a chord bearing N81°58'35" E 238.96 feet;
2) N74°56'08" E, 244.90 feet (14.1' beyond the beginning of a 43.5' wide strip, 2.5 acre in area described in Book 847 at Page 316);
3) 80.62 feet along the arc of a tangent curve to the right, said arc subtended by a radius of 727.80 feet, a central angle of 06°20'49", and a chord bearing N78°06'32" E 80.58 feet;
4) N81°16'57" E, 7.90 feet;

(continued)

5) 22.90 feet along the arc of a tangent curve to the right, said arc subtended by a radius of 727.80 feet, a central angle of 01°48'10", and a chord bearing N82°11'02" 22.90 feet;
6) N83°05'07" E, 599.90 feet;
7) 217.92 feet along the arc of a tangent curve to the right, said arc subtended by a radius of 727.80 feet, a central angle of 17°09'20", and a chord bearing S88°20'13" 217.11 feet;
8) S79°45'33" E, 394.90 feet;
9) 125.19 feet along the arc of a tangent curve to the left, said arc subtended by a radius of 797.80 feet, a central angle of 08°59'27", and a chord bearing S84°15'17" 125.06 feet;
10) S88°45'00" E, 447.00 feet;
11) 113.58 feet along the arc of a tangent curve to the left, said arc subtended by a radius of 797.80 feet, a central angle of 08°09'26", and a chord bearing N87°10'17" E, 113.49 feet;
12) N83°05'34" E, 469.60 feet to the southwesterly corner of a parcel of land recorded Book 1003 at Page 464;

Thence along boundary of said parcel the following three courses:
1) N83°05'34" E, 200.00 feet;
2) N06°54'26" W, 108.50 feet;
3) S83°05'34" W, 200.00 feet to the northeasterly corner of the previous parcel recorde in Book 847 at Page 316;

Thence along northerly line of said parcel the following five courses:
1) S83°05'34" W, 336.10 feet;
2) S06°54'26" E, 23.50 feet;
3) S83°05'34" W, 133.50 feet;
4) 101.48 feet along the arc of a tangent curve to the right, said arc subtended by a radius of 712.80 feet, a central angle of 08°09'26", and a chord bearing S87°10'17" 101.40 feet;
5) N88°45'00" W, 293.50 feet to the easterly corner of a parcel recorded in Book 934 at Page 209;

Thence along northerly line of said parcel the following two courses:
1) N79°31'35" W, 554.21 feet;
2) S88°19'28" W, 364.79 feet to a point on the northerly line of the previous parcel recorded in Book 847 at Page 316;

Thence along northerly line of said parcel the following eight courses:
1) S83°05'07" W, 585.80 feet;
2) 26.47 feet along the arc of a tangent curve to the left, said arc subtended by a radius of 812.80 feet, a central angle of 01°51'58", and a chord bearing S82°09'07" 26.47;

(continued)

3) 6.10 feet along the arc of a compound curve to the left, said arc subtended by a radius of 2755.00 feet, a central angle of 00°07'37", and a chord bearing S81°16'57" W, 6.10 feet;
4) 90.94 feet along the arc of a compound curve to the left, said arc subtended by a radius of 812.80 feet, a central angle of 06°24'37", and a chord bearing S78°08'26" W, 90.89 feet;
5) S74°56'08" W, 14.10 feet;
6) S15°03'52" E, 25.00 feet;
7) S74°56'08" W, 230.80 feet;
8) 395.38 feet along the arc of a tangent curve to the right, said arc subtended by a radius of 914.72 feet, a central angle of 24°45'57", and a chord bearing S87°19'06" W, 392.31 feet to a point on the northeasterly line of the parcel recorded at Book 512 at Page 418, being 50.00 feet northeasterly, as measured radially from the main track of the Boulder branch of the Union Pacific Railroad as now constructed and operated;

Thence along said Northeasterly line of parcel N66°52'58" W, 485.14 feet;
Thence N00°08'27" W, 1683.89 feet to a point on the South line of the NW1/4 of Section 12;
Thence N00°08'14" W, 2638.73 feet to the point of beginning.

Except portions conveyed to the Department of Transportation, State of Colorado by Rule and Order recorded June 23, 2000 at Reception No. 2776783

(continued)

PARCEL C-1

Commencing at the Southwest corner of Section 10, Township 1 North, Range 68 West, 6th P.M., from whence the West 1/4 corner of said Section lies N00°31'01" E, 2635.71 feet;
Thence N89°43'33" E, 86.08 feet;
Thence N00°08'27" W, 30.00 feet to the point of beginning
Thence continuing N00°08'27" W, 684.18 feet to a point on the southerly line of a parcel recorded in Book 512 at Page 337;
Thence along said Southerly line of parcel 408.40 feet along the arc of a non-tangent curve to the right, said arc subtended by a radius of 968.02 feet, a central angle of 24°10'22", and a chord bearing S85°43'12" E, 405.38 feet to the northeasterly corner of a parcel recorded in Book 833 at Page 482;

Thence around said parcel the following three courses:
1) S23°07'02" W, 44.34 feet;
2) S66°52'58" E, 545.00 feet;
3) N23°07'02" E, 50.00 feet; to a point on the southwesterly line of a parcel recorded in Book 359 at Page 418, being 50.00 feet southwesterly of the centerline of the main track of the Boulder branch of the Union Pacific Railroad as now constructed and operated;

Thence along line of said parcel the following two courses:
1) S66°52'58" E, 13.41 feet;
2) 825.61 feet along the arc of a tangent curve to the right, said arc subtended by a radius of 2757.50 feet, a central angle of 17°09'17", and a chord bearing S58°18'19" E, 822.53 feet to a point 30.00 feet northerly of the South line of the SW1/4 of Section 10;
Thence parallel with and 30.00 feet North of said South line S89°43'33" W, 1618.24 feet to the point of beginning.

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PARCEL C-2

Commencing at the Southwest corner of Section 10, Township 1 North, Range 68 West, 6th P.M., from whence the West 1/4 corner of said section lies N00°31'01" E, 2655.71 feet;
Thence N89°43'33" E, 86.08 feet;
Thence N00°08'27" W, 815.00 feet to the point of beginning;
Thence continuing N00°08'27" W, 47.81 feet to a point on the southwesterly line of a parcel recorded in Book 359 at Page 418, being 50.00 feet southwesterly, as measured perpendicularly, from the centerline of the main track of the Boulder branch of the Union Pacific Railroad as now constructed and operated;
Thence along said southwesterly line S66°52'58" E, 102.68 feet to a point on the northerl line of a parcel recorded in Book 512 at Page 337;
Thence along said northerly line 94.64 feet along the arc of a non-tangent curve to the left, said arc subtended by a radius of 1063.02 feet, a central angle of 05°04'38", and a chord bearing S85°27'14" W, 94.61 feet to the point of beginning.

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A parcel of land situate in the E1/2 of Section 18, Township 1 North, Range 68 West of th 6th P.M., Weld County, more particularly described as follows:

PARCEL D

Commencing at the Northeast corner of Section 18, Township 1 North, Range 68 West, 6th P.M., from whence the East 1/4 corner of said section lies S00°02'28" E, 2678.62 feet;
Thence N89°14'48" W, 30.07 feet to the point of beginning;
Thence S00°02'28" E, 1897.89 feet parallel with and 30.00 feet distant West of the East line of the NE1/4 of Section 18 to a point on the North line of the Erie Cemetery, partially described in a deed recorded on May 23, 1968, as Reception No. 1516751;
Thence N89°59'20" W, 640.42 feet to the Northwest corner of said cemetery;
Thence S00°03'40" W, 404.65 feet to the North line of a parcel recorded in Book 30, Page 483;
Thence N89°34'58" W, 163.67 feet to the Northwest corner of said parcel;
Thence S00°04'57" E, 417.42 feet to the Southwest corner of said parcel;
Thence S89°34'58" E, 804.84 feet to a point 30.00 feet westerly of the East line of the SE1/4 of Section 18;
Thence S00°25'10" E, 1450.65 feet parallel with and 30.00 feet distant westerly of the East line of said SE1/4 to a point on the North line of a parcel recorded as Reception No 1516751;

Thence along boundary of said parcel the following three courses:
1) S89°40'50" W, 658.56 feet,
2) S00°19'10" E, 253.00 feet,
3) N89°40'50" E, 659.00 feet to a point 30.00 feet westerly of the East line of the SE1, of Section 18;

Thence S00°25'10" E, 825.08 feet to a point 30.00 feet northerly of the South line of sai SE1/4 of Section 18, said point also being the northerly right-of-way line of Weld County Road 8;
Thence N89°31'17" W, 258.53 feet, along said northerly right of way, parallel with and 30.00 feet North of the South line of said SE1/4;
Thence N86°54'04" W, 1098.49 feet along the northerly line of Weld County Road 8, as described in Book 15551, Pages 39-43, Reception Nos. 2495437-41 to a point on the easterl line of property described in Book 754 at Reception No. 1676471;

Thence along said property the following three courses:
1) N00°29'16" E, 49.80 feet;
2) 453.09 feet along the arc of a tangent curve to the left, said arc subtended by a radius of 440.00 feet, a central angle of 59°00'00", and a chord bearing N29°00'44" W 433.33 feet;
3) N58°30'44" W, 204.67 feet to a point 50.00 feet distant southeasterly, measured at right angles, from the centerline of the main track of the Boulder branch of the Unio

(continued)

Pacific Railroad Company as presently constructed and operated, said right of way conveyed to the Union Pacific Railroad by deed recorded in Book 359 at Page 418;
Thence northerly along a line drawn parallel and/or radially with said centerline of main track the following nine courses:

1) 629.21 feet along the arc of a non-tangent curve to the left, said arc subtended by a radius of 1007.50 feet, a central angle of 35°46'57", and a chord bearing N07°31'37" E, 619.03 feet;
2) Thence N10°21'52" W, 694.70 feet;
3) 894.20 feet along the arc of a tangent curve to the right, said arc subtended by a radius of 1287.50 feet, a central angle of 39°47'36", and a chord bearing N09°31'57" E, 876.34 feet;
4) N29°25'45" E, 224.87 feet;
5) 463.85 feet along the arc of a tangent curve to the left, said arc subtended by a radius of 1673.50 feet, a central angle of 15°52'51", and a chord bearing N21°29'19" E, 462.36 feet;
6) N13°32'54" E, 421.72 feet;
7) 966.21 feet along the arc of a tangent curve to the left, said arc subtended by a radius of 2957.50 feet, a central angle of 18°43'06", and a chord bearing N04°11'21" E, 961.91 feet;
8) N05°10'12" W, 351.67 feet;
9) 165.08 feet along the arc of a tangent curve to the right, said arc subtended by a radius of 1575.00 feet, a central angle of 06°00'20", and a chord bearing N02°10'02" W, 165.01 feet to a point on the North line of the NE1/4 of Section 18;

Thence along said North line S89°14'48" E, 1206.77 feet to the point of beginning,
EXCEPTING THEREFROM a "road right of way 8 feet in width leading to said cemetery from Erie", so described in Book 30 at Page 483.

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A parcel of land situate in Section 17, Township 1 North, Range 68 West of the 6th P.M., Weld County, more particularly described as follows:

PARCEL E

Commencing at the Northeast corner of Section 17, Township 1 North, Range 68 West, 6th P.M., from whence the East 1/4 corner of said Section lies S00°12'52" E, 2631.66 feet;
Thence S44°24'11" W, 42.71 feet to the point of beginning, 30.00 feet westerly of the East line of the N1/2 of Section 17;
Thence S00°12'52" E, 2601.26 feet parallel with and 30.00 feet West of the East line of the N1/2 of Section 17;
Thence S00°13'30" E, 2602.21 feet parallel with and 30.00 feet West of the East line of the SE1/4 of Section 17 to a point 30.00 feet northerly of the South line of the SE1/4 of Section 17;
Thence S88°48'09" W, 2618.87 feet parallel with and 30.00 feet North of the South line of the SE1/4 of Section 17;
Thence S88°48'45" W, 2617.65 feet parallel with and 30.00 feet North of the South line of the SW1/4 of Section 17 to a point 30.00 feet easterly of the West line of the SW1/4 of Section 17;
Thence N00°29'10" W, 2573.96 feet parallel with and 30.00 feet East of the West line of the SW1/4 of Section 17;
Thence N00°02'28" W, 2649.01 feet parallel with and 30.00 feet East of the West line of the NW1/4 of Section 17 to a point 30.00 feet southerly of the North line of Section 17;
Thence N89°01'14" E, 5236.94 feet parallel with and 30.00 feet South of the North line of Section 17 to the point of beginning.

(continued)

A parcel of land situate in the E1/2 of Section 33, Township 2 North, Range 68 West of th 6th P.M., Weld County, more particularly described as follows:

PARCEL F

Commencing at the Northeast corner of said Section 33 from whence the East 1/4 corner li S00°02'01" E, 2661.98 feet;
Thence along the East line of the NE1/4 of said Section 33 S00°02'01" E, 30.00 feet;
Thence along a line parallel with and 30.00 feet southerly, measured at right angles, fr the North line of the NE1/4 of said Section 33, S89°08'30" W, 150.02 feet to the point o beginning;
Thence continuing along said line parallel with and 30.00 feet distant southerly from th North line of the NE1/4 of Section 33, S89°08'30" W, 2491.97 feet to a point on the West line of the NE1/4 of said Section 33;
Thence S00°02'38" E, 2594.11 feet along West line to the SW1/4 corner of the NE1/4 of Section 33;
Thence S00°02'52" E, 2648.52 feet along the West line of the SE1/4 of said Section 33 to point that is 30.00 feet distant northerly from the South 1/4 corner of said Section 33;
Thence N89°37'29" E, 487.95 feet along a line parallel with and 30.00 feet distant northerly from the South line of the SE1/4 of said Section 33 to a point on the East lin of a parcel recorded in Book 1506, Reception No. 2451280;
Thence along East line of said parcel N03°40'23" E, 2651.19 feet to a point on the South line of the NE1/4 of said Section 33;
Thence N89°57'46" E, 1951.25 feet along the South line of the NE1/4 of Section 33 to a point that is 30.00 feet distant westerly from the East 1/4 corner of said Section 33;
Thence N00°02'01" W, 722.66 feet along a line parallel with and 30.00 feet distant westerly from the East line of the NE1/4 of Section 33 to the Southeast corner of the parcel recorded May 13, 1998, at Reception No. 2612563;

Thence along said parcel the following three courses:
1. S89°57'59" W, 363.76 feet;
2. N00°02'01" W, 240.00 feet;
3. N89°57'59" E, 363.76 feet;

Thence N00°02'01" W, 449.60 feet along a line parallel with and 30.00 feet distant westerly from the East line of the NE1/4 of Section 33 to a point on the South line of th parcel recorded at Reception No. 2288334;
Thence along the South line of said parcel S89°57'59" W, 250.00 feet to the Southwest corner of parcel;
Thence along the West line of said parcel N00°02'01" W, 120.00 feet to a point on the South line of that parcel owned by Nick Harkales in the year 1948;
Thence along South line of said parcel S89°57'59" W, 10.00 feet to the Southwest corner o the parcel;
Thence along West line of said parcel N00°02'01" W, 110.00 feet to a point on the South

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line of a parcel recorded January 29, 1993, in Book 1368 at Reception No. 2319926;

Thence along said parcel the following three courses:
1. S89°57'59" W, 3.30 feet;
2. N00°02'01" W, 56.21 feet;
3. N89°57'59" E, 263.30 feet;
Thence N00°02'01" W, 353.51 feet along a line parallel with and 30.00 feet distant westerly from the East line of the NE1/4 of Section 33 to the Southeast corner of a parcel recorded April 12, 1945, in Book 1153, Page 15;
Thence along the South line of said parcel S89°57'59" W, 150.00 feet;
Thence N00°02'01" W, 150.00 feet to the Northwest corner of a parcel recorded April 24, 1926, in Book 788, Page 400;
Thence along North line of said parcel N89°57'59" E, 150.00 feet;
Thence N00°02'01" W, 304.55 feet along a line parallel with and 30.00 feet distant westerly from the East line of the NE1/4 of Section 33;
Thence S89°08'30" W, 120.01 feet;
Thence N00°02'01" W, 125.01 feet to the point of beginning.

(continued)

Three parcels of land situate in Section 19, Township 1 North, Range 68 West of the 6th P.M., Weld County, More particularly described as follows:

PARCEL G

Commencing at the Northeast corner of the NW1/4 of the NE1/4 of Section 19, Township 1 North, Range 68 West, 6th P.M., from whence the Northeast corner of Section 19 lies S89°31'17" E, 1298.14 feet;
Thence S00°24'57" E, 24.66 feet along the East line of the W1/2 of the NE1/4 of Section 19 to the point of beginning;
Thence continuing along line S00°24'57" E, 2609.86 feet to a point on the South line of NE1/4 of Section 19;
Thence along East line of the W1/2 of the SE1/4 of Section 19 S00°25'02" E, 2604.36 feet to a point 30.00 feet northerly of the South line of the SE1/4 of Section 19;
Thence S89°56'56" W, 1292.51 feet parallel with and 30.00 feet North of the South line of the SE1/4 of Section 19;
Thence S89°57'02" W, 1267.09 feet parallel with and 30.00 feet North of the South line of the SW1/4 of Section 19;
Thence N00°33'50" W, 2616.47 feet along the West line of the E1/2 of the SW1/4 to the South line of the NW1/4 of Section 19;
Thence along the South line of said NW1/4 S89°46'26" E, 1.97 feet to a point on the easterly line of a parcel of land recorded at Reception No. 2633609;

Thence along the easterly line of said parcel the following five courses:

1) 94.67 feet along the arc of a non-tangent curve to the left, said arc subtended by a radius of 340.00 feet, a central angle of 15°57'12", and a chord bearing N22°39'50" W, 94.36 feet,
2) 29.56 feet along the arc of a reverse curve to the right, said arc subtended by a radius of 20.00 feet, a central angle of 84°40'19", and a chord bearing N11°41'44" E, 26.94 feet,
3) 236.41 feet along the arc of a reverse curve to the left, said arc subtended by a radius of 950.00 feet, a central angle of 14°15'29", and a chord bearing N46°54'09" E, 235.80 feet,
4) N39°46'24" E, 2542.95 feet,
5) 888.62 feet along the arc of a tangent curve to the right, said arc subtended by a radius of 1030.00 feet, a central angle of 49°25'52", and a chord bearing N64°29'20" E, 861.31 feet, to the point of beginning.

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PARCEL G-1

Commencing at the N 1/4 corner of Section 19, Township 1 North, Range 68 W, 6th P.M., from whence the Northwest corner of said section lies N89°30'18" W, 2543.60 feet;
Thence along the North line of the NW1/4 of Section 19 N89°30'18" W, 1108.21 feet to the point of beginning;
Thence S56°52'34" E, 304.45 feet parallel with and 100.00 feet distant, southwesterly, from the centerline of the Boulder branch of the main track of the Union Pacific Railroad Company, as presently constructed and operated;
Thence continuing parallel with and 100.00 feet distant, measured radially, from the centerline of said railroad track, 1393.34 feet along the arc of a tangent curve to the left, said arc subtended by a radius of 1050.98 feet, a central angle of 75°57'37", and a chord bearing N85°08'37" E, 1293.52 feet, bounded northerly, in part, by a parcel of land recorded in Book 1453, Reception No. 2400985, to a point on the boundary of a parcel of land recorded at Reception No. 2633609;

Thence along westerly boundary of said parcel the following four courses:
1) S00°17'05" E, 242.48 feet,
2) 36.04 feet along the arc of a non-tangent curve to the left, said arc subtended by a radius of 1170.00 feet, a central angle of 01°45'54", and a chord bearing S40°39'21" W, 36.04 feet,
3) S39°46'24" W, 2542.95 feet,
4) 492.51 feet along the arc of a tangent curve to the right, said arc subtended by a radius of 810.00 feet, a central angle of 34°50'17", and a chord bearing S57°11'33" W 484.96 feet, to a point on the East line of a parcel of land recorded in Book 1623, Reception No. 2566192;

Thence along said easterly line the following three courses:
1) N01°09'00" E, 63.08 feet,
2) 242.86 feet along the arc of a tangent curve to the right, said arc subtended by a radius of 5679.65 feet, a central angle of 02°27'00", and a chord bearing N02°12'02" E, 242.84 feet,
3) N03°35'48" E, 2245.72 feet to the northerly line of the NW1/4 of Section 10;
Thence S89°30'18" E, 361.43 feet along said northerly line to the point of beginning.

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PARCEL G-2

Commencing at the Northwest corner of Section 19, Township 1 North, Range 68 W, 6th P.M. from whence the W1/4 corner of said section lies S00°30'22" E, 2652.75 feet;
Thence along the North line of the NW1/4 of Section 19 S89°30'18" E, 30.00 feet to the point of beginning;
Thence continuing along said North line, S89°30'18" E, 943.81 feet to a point on the West line of a parcel of land described in Book 1623, Reception No. 2566192,

Thence along said West line the following three courses:
1) S03°35'48" W, 2240.30 feet,
2) 247.14 feet along the arc of a tangent curve to the left, said arc subtended by a radius of 5779.65 feet, a central angle of 02°27'00", and a chord bearing S02°12'31" W, 247.11 feet,
3) S01°08'50" W, 86.00 feet, to a point on the North line of a parcel of land recorded as Reception No. 2633609;

Thence along North line of said parcel the following two courses:
1) 118.06 feet along the arc of a non-tangent curve to the right, said arc subtended by radius of 810.00 feet, a central angle of 08°21'05", and a chord bearing S86°03'02" W, 117.96 feet,
2) N89°46'26" W, 651.49 feet to a point 30.00 feet easterly of the West line of the NW1/4 of Section 19;
Thence N00°30'22" W, 2582.61 feet parallel with and 30.00 feet East of West line of the NW1/4 of Section 19 to the point of beginning.

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EXHIBIT B

Attached to and made a part of Agreement for Compatible Development
dated November 14, 2000, by and among
UNION PACIFIC LAND RESOURCES CORPORATION,
UNION PACIFIC RESOURCES COMPANY, and
WELD COUNTY LAND COMPANY, LLC

318A. Greater Wattenberg Area Special well location rule.

a. The Greater Wattenberg Area ("GWA") is defined to include those lands from and including Townships 2 South to 7 North and Ranges 61 West to 68 West, 6th P.M. In GWA, operators may utilize the following described drilling locations to drill or twin a well, deepen a well, or recomplete a well and to commingle any or all of the Cretaceous Age formations from the base of the Dakota to the surface ("GWA wells"):

(1) a square with sides four hundred (400) feet in length, the center of which is the center of any quarter/quarter section; and,

(2) a square with sides eight hundred (800) feet in length, the center of which is the center of any quarter section.

b. Any GWA well in existance prior to the effective date of this rule, which is not located as described above, may also be utilized for deepening to or recompletion in any Cretaceous Age formation, and for the commingling of production therefrom.

c. Where an existing well cannot be utilized for deepening or recompletion, for reasons including, but not limited to, differing ownership or wellbore limitations, any new, twinned well shall be located as close to such existing well as is practicable, consistent with sound engineering practice.

d. This rule does not alter the size or configuration of drilling units for GWA wells in existance prior to its effective date. Where deemed necessary an operator for purposes of allocating production, such operator may allocate production to an expanded drilling unit with respect to a particular Cretaceous Age formation consistent with the provisions of this rule.

e. This rule shall not serve to bar the granting of relief to owners who file an application alleging abuse of their correlative rights to the extent that such owners can demonstrate that their opportunity to produce the Cretaceous Age formations from the drilling locations herein authorized does not provide an equal opportunity to obtain their just and equitable share of oil and gas from such formations.

f. Subject to Paragraph d. above, this rule supersedes all prior Commission drilling and spacing orders affecting the GWA wells. Well location exceptions to this rule shall be subject to the provisions of Rule 318.c.

EXHIBIT C

Attached to and made a part of Agreement for Compatible Development
dated November 14, 2000, by and among
UNION PACIFIC LAND RESOURCES CORPORATION,
UNION PACIFIC RESOURCES COMPANY, and
WELD COUNTY LAND COMPANY, LLC

Probable Owners of Oil and Gas Leasehold Interests:

HS Resources, Inc.
1999 Broadway, Suite 3600
Denver, Colorado 80202

United States Exploration, Inc.
1560 Broadway, Suite 1900
Denver, Colorado 80202

Patina Oil & Gas Corporation ("Patina")
1625 Broadway, Suite 2000
Denver, Colorado 80202

North American Resources Company ("NARCO")
1700 Broadway, Suite 508
Denver, Colorado 80290

2. Probable Oil and Gas Interests as Follows:

Township 2 North, Range 68 West	
Section 33: NE4 and part of W2SE4	UXP, HS and Patina
Township 1 North, Range 68 West	
Section 4: All	HS and UXP
Section 8: SE4	HS and UXP
Section 10: All	HS and UXP
Section 17: All	HS and UXP
Section 18: E2 east of RR r/w	NARCO, HS, Thomas S. Morton and James G. Norton
Section 19: W2E2, E2SW4 and NW4	NARCO and HS

AMENDMENT OF RIGHT-OF-WAY GRANT **PARAGRAPH G**

THIS AMENDMENT OF RIGHT-OF-WAY GRANT ("Amendment") is entered into this 17th day of April, 2014, by and between **Daybreak Metropolitan District No. 3, a quasi-municipal corporation and political subdivision of the State of Colorado**, with an address of c/o White, Bear & Ankele, 2154 E. Commons Avenue, Suite 2000, Centennial, Colorado 80122 and **Daybreak Recovery Acquisition LLC, a Delaware limited liability company**, with an address of 1251 Avenue of the Americas, 50th Floor, New York, New York 10020 (together the "Grantors") and **Kerr-McGee Gathering LLC, a Colorado limited liability company** ("KMGG"), with an address of 1099 18th Street, Denver, Colorado 80202. Grantors and KMGG are sometimes referred to hereinafter alone or together as a "Party" or the "Parties."

RECITALS

A. Tallgrass Investors, LLC, a Colorado limited liability company granted, conveyed and warranted a Right-of-Way Grant to KMGG dated August 20, 2007 and recorded in the Office of the Clerk and Recorder of Weld County on September 20, 2007 at Reception No. 3505741 and re-recorded on January 21, 2009 at Reception No. 3600584 ("Easement") granting and conveying a perpetual right-of-way and easement for purposes of surveying, constructing, operating, replacing and maintaining (among other purposes) one (1) four inch (4") pipeline and appurtenances in, over and across a portion of the SE/4 of Section 8, Township 1 North, Range 68 West of the 6th P.M., Weld County, Colorado ("Property"), all as specifically described in the Easement, copies of the recorded duplicate Easements being attached hereto as Exhibit 1.

B. Grantors are successors in interest to Tallgrass Investors, LLC.

C. KMGG has constructed a pipeline within the Easement, and KMGG now desires, among other things, to construct, operate and maintain an additional pipeline (the "Additional Pipeline") within the Easement.

D. Purposes of this Amendment are: i) to provide for and allow the Additional Pipeline within the Right-of-Way Lands; ii) to amend the property description of the Right-of-Way Lands to extend the Easement to run the full length north to south along the east boundary of the SE/4 of Section 8; iii) to provide for a temporary easement on the Property as described herein; iv) to include certain agreed upon landscaping provisions in the Easement; and v) to allow KMGG to change the size of the existing four-inch pipeline.

NOW, THEREFORE, in consideration of Ten Dollars ($10) and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Grantors and KMGG hereby agree to amend the Easement as follows:

1. Each of Grantors, for itself, represents and warrants to KMGG that (i) it is the sole owner in fee simple of that portion of the Right-of-Way Lands to which it holds title, subject to the burden of current taxes, the Easement and any prior recorded easements, public dedications and other matters of record, and (ii) it has full right, power and authority to enter into this Amendment.

2. The description of the Right-of-Way Lands as described on Exhibit A to the Easement is hereby amended to be the description on Exhibit 2 to this Amendment. Exhibit 2 to this Amendment replaces Exhibit A to the Easement. A reference herein and in the Easement to the "Right-of-Way Lands" shall be a reference to the property described in the attached Exhibit 2.

3. Paragraph 2 of the Easement is amended to allow for one (1) four-inch (4") pipeline and one additional pipeline not to exceed sixteen inches (16").

4. KMGG may elect to change the size of the existing four-inch (4") pipeline to any size up to twelve inches (12").

5. Prior to any landscaping activities on the Right-of-Way Lands, Grantors shall prepare and submit a landscape plan to KMGG for the review and consent of KMGG, such consent not be unreasonably withheld; provided, however, it shall not be unreasonable for KMGG to withhold consent to the installation of trees, bushes or other landscape improvements on a case by case basis for safety reasons related to a pipeline or a portion of a pipeline or because of the

type of bush, tree or other landscape improvement proposed by Grantors. If KMGG withholds its consent, KMGG shall propose reasonable solutions to Grantors. KMGG shall be liable for damages to landscaping within the Right-of-Way Lands to the extent caused by the construction or operation of pipelines constructed within the Right-of-Way Lands, but only for landscaping that is installed pursuant to a landscape plan approved by KMGG as provided herein.

6. Grantors hereby grant and convey unto KMGG a temporary construction easement for a term of eighteen (18) months from the date of this Amendment for purposes of surveying, accessing, staging and storing materials and equipment necessary or convenient for the construction of the Additional Pipeline. The temporary construction easement shall be shall be adjacent to and west of the Right-of-Way Lands, as depicted on the attached Exhibit 3 as "Temporary Work Space".

7. KMGG shall not bring onto or permit to be brought onto the Right-of Way Lands or Temporary Work Space, any hazardous or toxic substance or material (including petroleum) regulated by the State of Colorado, the United States government, or any other government authority with applicable jurisdiction ("Hazardous Materials"), without the express written permission of Grantor. Grantor does acknowledge that the Easement as hereby amended, is granted to KMGG for the installation and operation of pipelines for the transportation or transmission of oil, gas, petroleum products, water, hydrocarbons or mixtures of any of the forgoing and Grantor does hereby grant to KMGG express written permission to transport said products across the Right-of-Way Lands.

8. The Easement, as amended by this Amendment ("Amended Easement"), cannot be modified except by a written agreement signed by the Parties.

9. Except as modified herein, and except to the extent necessary to conform to and incorporate the provisions of this Amendment, all other terms, covenants and obligations of the Easement shall remain in full force and effect and are hereby affirmed by the Parties. In the event of a conflict between this Amendment and the Easement for a matter specifically covered herein, this Amendment shall control.

10. Exhibits 1, 2 and 3 are incorporated into this Amendment by reference.

11. The rights granted herein may be assigned in whole or in part, and the terms, conditions and provisions of the Amended Easement shall extend to and be binding upon the heirs, executors, administrators, personal representatives, successors and assigns of Grantors and KMGG.

IN WITNESS WHEREOF, the Parties have executed this Amendment as of the date first above written.

Daybreak Metropolitan District No. 3, a quasi-municipal corporation and political subdivision of the State of Colorado

By: Jerry B Richmond III
Name: JERRY B. RICHMOND III
Title: BOARD PRESIDENT

Daybreak Recovery Acquisition LLC, a Delaware limited liability company

By: _____
Name: Jonathan Shymaker
Title: Authorized Signatory

KERR-MCGEE GATHERING LLC, a Colorado limited liability company

By: _____
, Agent and Attorney-in-Fact

STATE OF Colorado)
)ss.
COUNTY OF Arapahoe)

The foregoing instrument was acknowledged before me this 22nd day of April, 2014, by Jerry R. Richmond, as Board President of Daybreak Metropolitan District No. 3, a quasi-municipal corporation and political subdivision of the State of Colorado.

Witness my hand and official Seal.

My Commission Expires: 2/17/16

Wendy J Craven
Notary Public

WENDY J CRAVEN NOTARY PUBLIC STATE OF COLORADO COMM. EXP. 02-17-16

(SEAL)

STATE OF New York)
)ss.
COUNTY OF New York)

The foregoing instrument was acknowledged before me this 17th day of April, 2014, by Jonathan Shumaker, as Authorized Signatory of Daybreak Recovery Acquisition LLC, a Delaware limited liability.

Witness my hand and official Seal.

My Commission Expires:

STEPHANIE SCHULMAN
Notary Public, State of New York
No. 02SC6258887
Qualified in Westchester County
Commission Expires April 9, 2016

Stephanie Schulman
Notary Public

(SEAL)

STATE OF COLORADO)
)ss.
COUNTY OF DENVER)

The foregoing instrument was acknowledged before me this _____ day of_____, 20__, by_____, as Agent and Attorney-in-Fact for Kerr-McGee Gathering LLC, a Colorado limited liability company, on behalf of such company.

WITNESS my hand and official seal.

My commission expires: _____

_____
Notary Public

Notary Public

(SEAL

Exhibits

Exhibit 1--duplicate original recorded Easements

Exhibit 2---description of right-of way lands

Exhibit 3---depiction of temporary construction easement

Rec No. 3654328
UP CO V7\4 Pcl 2.

Daybreak Metro
District No. 3
Rec No. 3955791

**100'x100'
Temporary
Work Space**

50' Easement
Vessels Oil & Gas
Rec No. 2042899

REQUESTED ROW

Northerly Line
Rec No. 3505741
Rec No. 3600584

SE 1/4 SECTION 8
T1N R68W 6th PM

30' Right of Way
Rec No. 3505741
Rec No. 3600584

Daybreak Recovery Acquisition LLC
Rec No. 3955792

East Line
Tract 18

**Tract 18 Bridgewater
Master Subdivision
Rec No. 3811552**

WCR 5

90' WCR 5
Right of Way

**20' Temporary
Work Space**

50' Easement
Vessels Oil & Gas
Rec No. 2042899

CURRENT ROW

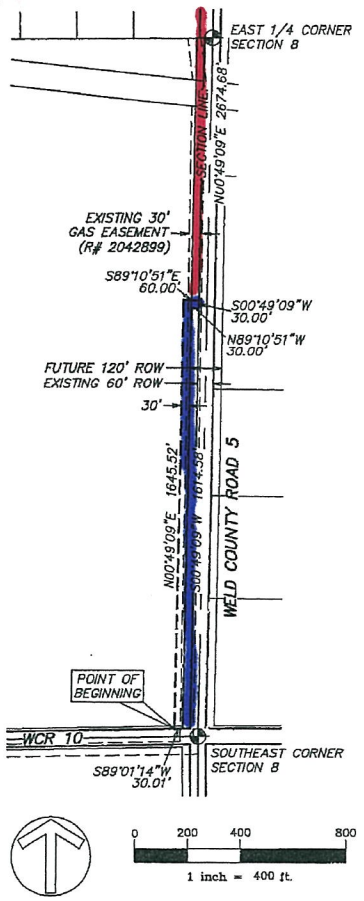
South Line
Tract 18

EXHIBIT 1
Of Amendment of Right-of-Way Grant

3505741 09/20/2007 05:20P Weld County, CO
3 of 3 R 16.00 D 0.00 Steve Moreno Clerk & Recorder

Attached to and made a part of that certain Right-of-Way Grant dated August 20, 2007, from Tallgrass Investors LLC, to Kerr-McGee Gathering LLC.

EXHIBIT A



EASEMENT DESCRIPTION:

A 30.00 FOOT WIDE EASEMENT ACROSS THE SOUTHEAST QUARTER OF SECTION 8, TOWNSHIP 1 NORTH, RANGE 68 WEST OF THE 6TH P.M., COUNTY OF WELD, STATE OF COLORADO, DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHEAST CORNER OF SAID SECTION 8 FROM WHENCE THE EAST QUARTER CORNER LIES N00°49'09"E, 2,674.68 FEET (BASIS OF BEARINGS);

THENCE S89°01'14"W, 89.10 FEET ALONG THE SOUTHERLY LINE OF THE SOUTHEAST QUARTER OF SECTION 8;

THENCE N00°58'46"W, 30.00 FEET TO THE NORTHERLY RIGHT OF WAY LINE OF WELD COUNTY ROAD 10 AND THE POINT OF BEGINNING;

THENCE N00°49'09"E, 1,645.52 FEET ALONG A LINE PARALLEL WITH AND 90.00 FEET WEST OF THE EASTERLY LINE OF SAID SOUTHEAST QUARTER;

THENCE S89°10'51"E, 60.00 FEET TO THE WESTERLY RIGHT OF WAY LINE OF WELD COUNTY ROAD 5;

THENCE S00°49'09"W, 30.00 FEET ALONG SAID WESTERLY RIGHT OF WAY LINE;

THENCE N89°10'51"W, 30.00 FEET;

THENCE S00°49'09"W, 1,614.58 FEET ALONG A LINE PARALLEL WITH AND 60.00 FEET WEST OF THE EASTERLY LINE OF THE SOUTHEAST QUARTER OF SECTION 8;

THENCE S89°01'14"W, 30.01 FEET ALONG THE NORTHERLY RIGHT OF WAY LINE OF WELD COUNTY ROAD 10 TO THE POINT OF BEGINNING, CONTAINING 50,252 SQUARE FEET, MORE OR LESS.

GAS EASEMENT
FUTURE BRIDGEWATER
SE 1/4 SEC. 8, T1N, R68W
WELD COUNTY, CO.

SCALE	HOR. 1"=400' VERT. N/A
DESIGN/APPR.	BO
DRAWN BY	BO
DATE	07/09/07

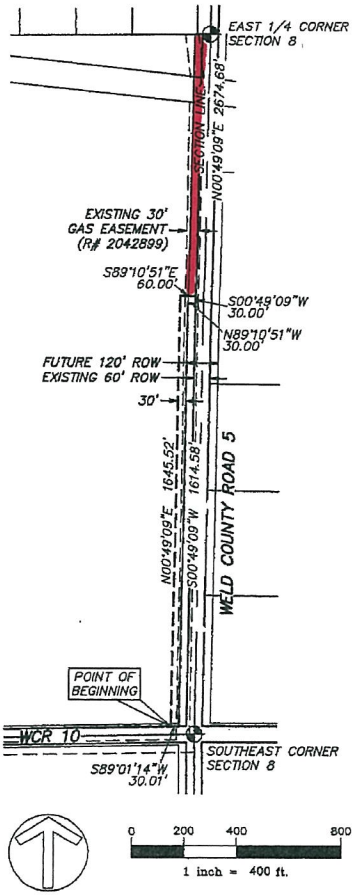
HURST & ASSOCIATES, INC.
CONSULTING ENGINEERS
4990 Pearl East Circle, Suite 106
Boulder, Colorado 80301 (303) 449-9195

FILE G:\202042\SURVEY\LEGAL\SEB GAS ESMT SHEET 1 OF 1

EXHIBIT 1
Of Amendment of Right-of-Way Grant

Exhibit "A"
Attached to and made a part of the certain Right-of-Way Grant dated August 20, 2007
between Tallgrass Investors LLC, Grantor(s) and Kerr-McGee Gathering, LLC, Grantee.

EXHIBIT A



EASEMENT DESCRIPTION:

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COMMENCING AT THE SOUTHEAST CORNER OF SAID SECTION 8 FROM WHENCE THE EAST QUARTER CORNER LIES N00°49'09"E, 2,674.68 FEET (BASIS OF BEARINGS);

THENCE S89°01'14"W, 89.10 FEET ALONG THE SOUTHERLY LINE OF THE SOUTHEAST QUARTER OF SECTION 8;

THENCE N00°58'46"W, 30.00 FEET TO THE NORTHERLY RIGHT OF WAY LINE OF WELD COUNTY ROAD 10 AND THE POINT OF BEGINNING;

THENCE N00°49'09"E, 1,645.52 FEET ALONG A LINE PARALLEL WITH AND 90.00 FEET WEST OF THE EASTERLY LINE OF SAID SOUTHEAST QUARTER;

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THENCE S00°49'09"W, 30.00 FEET ALONG SAID WESTERLY RIGHT OF WAY LINE;

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THENCE S00°49'09"W, 1,614.58 FEET ALONG A LINE PARALLEL WITH AND 60.00 FEET WEST OF THE EASTERLY LINE OF THE SOUTHEAST QUARTER OF SECTION 8;

THENCE S89°01'14"W, 30.01 FEET ALONG THE NORTHERLY RIGHT OF WAY LINE OF WELD COUNTY ROAD 10 TO THE POINT OF BEGINNING, CONTAINING 50,252 SQUARE FEET, MORE OR LESS.

GAS EASEMENT
FUTURE BRIDGEWATER
SE 1/4 SEC. 8, T1N, R68W
WELD COUNTY, CO.

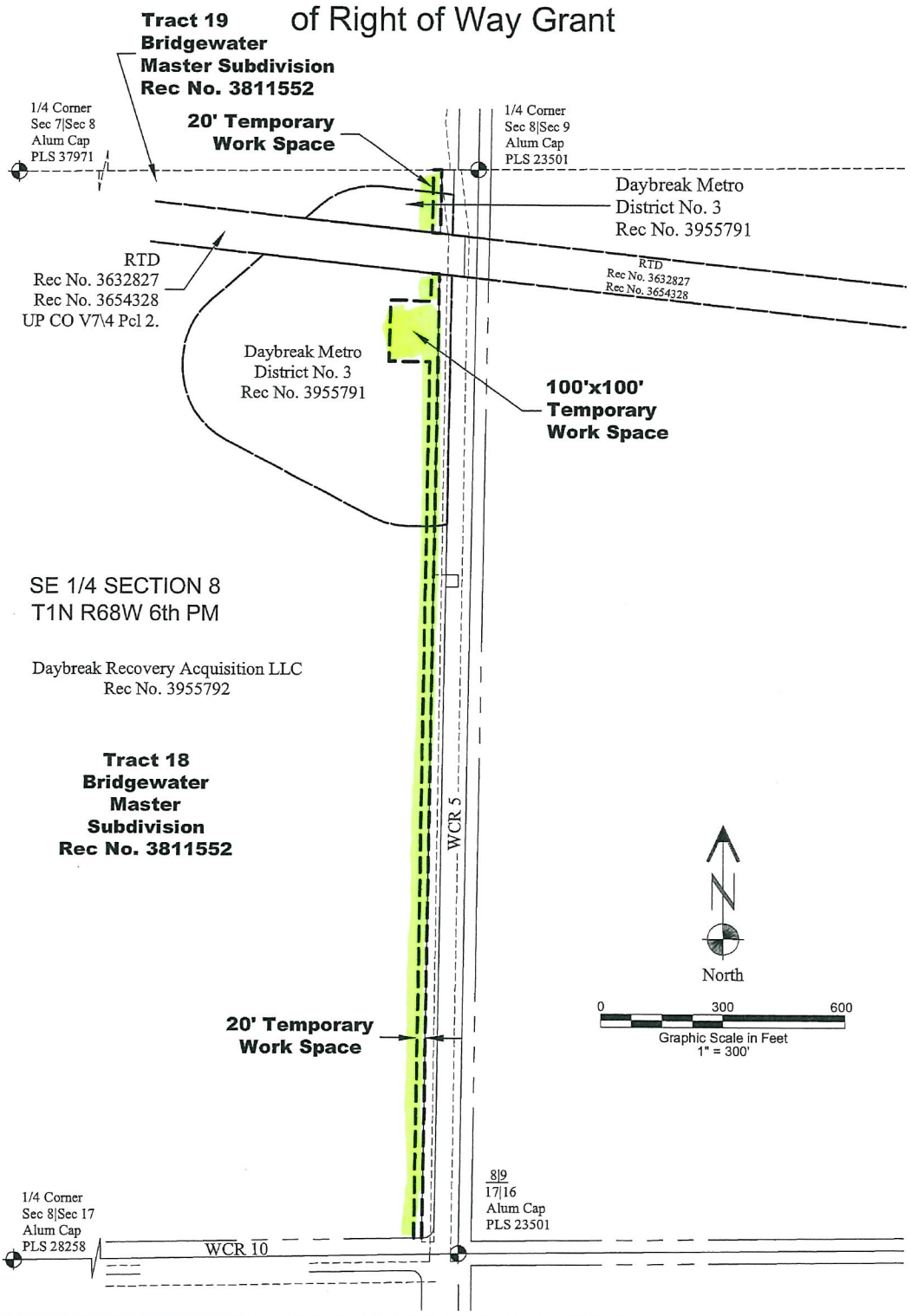
SCALE	HOR. 1"=400' VERT. N/A
DESIGN/APPR.	BO
DRAWN BY	BO
DATE	07/09/07

HURST & ASSOCIATES, INC
CONSULTING ENGINEERS
4999 Pearl East Circle, Suite 106
Boulder, Colorado 80301 (303) 541-9155

FILE G:\202042\SURVEY\LEGALS\SEB GAS ESMT SHEET 1 OF 1

3600584 01/21/2009 11:28A Weld County, CO
3 of 3 R 16.00 D 0.00 Steve Moreno Clerk & Recorder

Exhibit 3 of Amendment of Right of Way Grant



1 OF 1	SHEET NO.	GEOSURV LAND SURVEYING AND MAPPING LAFAYETTE - WINTER PARK Ph 303 666 0379 Fx 303 665 6320	KERR-McGEE Right of Way Survey	TOWNSHIP: 1 North RANGE: 68 West 6th PM COUNTY: Weld STATE: Colorado	1"= 300' 12/23/2013 BY: jtv	SAP AFE: 2075225 TRACKING: 9412021 REVISIONS:

DWG: G:\GEOSURV\WeldzNorth\KERR MCGEE GATHERING\200 Lateral 111005.2\Easements on Ground\Daybreak.dwg USER: JTV DATE: Dec 23, 2013 1:39pm

Abstract of Kerr-McGee Letter Agreement Re: Pipelines

DayBreak Community, Weld County, Colorado
Sections 8, 17 and 18, T1N, R68W

Date: October 11, 2011

Recording Date/Info: not recorded

Property: Portions of Sections 8, 17 and 18, T1N, R68W

Parties:

Surface Owner: Tallgrass Investors, LLC

Pipeline/Gas Gathering Company: Kerr-McGee Gathering LLC (**KMGG**)

Abbreviations:

All letter references in parentheses identify the sections of the Letter Agreement (**Agreement**) under discussion.

Background:

KMGG owns certain rights-of-way and easements over the Property (**Land Rights**), providing for the right to construct, operate and maintain pipelines pursuant to oil and gas leases, gas purchase agreements, surface use agreements and similar contracts. Those Land Rights allow KMGG to operate and maintain pipelines, valve sites, meter stations and other improvements above and below ground for transporting oil, gas and other hydrocarbons produced from wells on the Property and other lands.

The Agreement generally calls for the amendments to existing easements held by KMGG and the relocation and/or removal of portions of existing pipelines used by KMGG, all affecting the Property.

Agreement Summary:

I. **Amendments to Recorded Easements**. Surface Owner agrees to execute and deliver to KMGG the amendments to specified easements as described below.

a. **Easement 1:** Easement Deed dated October 13, 1980, and recorded November 21, 1980, Book 920, Reception No. 1842244, to be amended to provide for the following:

i. Construction of a new 24" pipeline, in addition to the 8" and 16" natural gas pipelines permitted by Easement 1;

ii. Construction of interconnections for future and existing pipelines as KMGG determines necessary or convenient within the area depicted on **Exhibit C** to the Agreement (and copied here);

iii. Amendment of the description of the easement area, to be 50 feet wide or otherwise accommodating current and future pipeline interconnections, as depicted on that **Exhibit C**;

iv. Grant to KMGG of a temporary 50-foot wide construction easement, south of the existing area, to expire 18 months after execution of the amendment to Easement 1.

Note: This amendment was to be executed within 14 days after execution of the Agreement (i.e., by October 25, 2011). (Paragraph C)

b. Easement 2: Easement Deed dated February 28, 1983, and recorded August 8, 1983, Book 1004, at Reception No. 1936290, to be amended to provide for the following:

i. Relocation, at KMGG's cost, of *Segment 2* as depicted on **Exhibit B** to Easement 2, to a location (A) adjacent to the road right-of-way for realigned County Road 3, or (B) under that road right-of-way (once required consents are obtained from the Town of Erie) if necessary to avoid impacting Surface Owner's ability to construct residences on Lots 5, Block 1; Lots 7 and 8, Block 2; and Lots 1 through 5, Block 9, all as depicted on page 3 of Bridgewater Filing No. 1 Preliminary Utility and Grading Plan, dated September 6, 2011, attached to the Agreement (and to this abstract);

ii. The change in the size of the *Segment 2* pipeline;

iii. Provision for the amended easement to measure 50 feet in width during construction, and 30 feet in width after construction;

iv. Clarification that KMGG will not be required to perform any further relocation or removal of any other segments within the Property covered by Easement 2, unless the Town or other governmental entity requires the change, in which case KMGG will be responsible for the work;

v. Requirements binding Surface Owner and KMGG in the event the pipeline is placed within an area designated as a landscape area within *Segment 2A* on **Exhibit B** to the Agreement (attached here), so that Surface Owner may install grasses (but not trees or shrubs) and soft or hard surface trails over and across pipeline easements, subject to the following conditions:

1. The local jurisdiction may request Surface Owner to install trees or bushes within the pipeline easements located on the Property, and in that case Surface Owner must prepare a landscape plan for review and reasonable approval by KMGG. Bushes will be preferred

over trees; and trees and bushes may not be located on the surface of the pipeline easement area within 5 feet of a pipeline;

2. KMGG may withhold its approval for the installation of trees and bushes for safety reasons or the convenient installation and maintenance of pipelines, but KMGG must propose reasonable alternatives when withholding consent to the landscape plan;

3. KMGG shall *not* be liable for damages to the trails, grasses, bushes or trees caused in whole or in part by their pipeline operations.

vi. Requirements binding Surface Owner and KMGG for *Segment 2B* on **Exhibit B:**

1. The existing pipeline in this *Segment 2B* will not be relocated or removed.

2. For *Segment 2B* and the portion of *Segment 2A* adjacent to realigned County Road 3:

a. Surface Owner will prepare a landscape plan for KMGG's reasonable approval;

b. KMGG may withhold its approval for the installation of trees and bushes for safety reasons or the convenient installation and maintenance of pipelines, but KMGG must propose reasonable alternatives when withholding consent to the landscape plan;

c. KMGG shall be liable for damages to the trails, grasses, bushes or trees caused in whole or in part by their pipeline operations. (Paragraph D)

c. Easement 3: Easement Deed dated January 16, 1988, and recorded February 13, 1986, in Book 1103 at Reception No. 02042890, to be amended to provide the following:

i. Regarding *Segment 3A* as depicted on **Exhibit B**:

1. Decommissioning or removal of *Segment 3A*, at KMGG's cost;

2. Relocation of *Segment 3A*, once new pipelines are constructed in a new easement (75 feet wide during construction, and 50 feet wide after construction) in the SW/4 of Section 17 and E/2 of Section 18, T1N, R68W, as shown on **Exhibit B**, to be documented by KMGG's right-of-way form and allowing more than one pipeline and surface appurtenances;

3. Requirements that if the pipeline is placed within an area designated as a landscape area within **Exhibit B**,

    a. Surface Owner may install grasses (but not trees or shrubs) and soft or hard surface trails over and across pipeline easements, subject to the following conditions:

    b. The local jurisdiction may request Surface Owner to install trees or bushes within the pipeline easements located on the Property, and in that case Surface Owner must prepare a landscape plan for review and reasonable approval by KMGG. Bushes will be preferred over trees; and trees and bushes may not be located on the surface of the pipeline easement area within 5 feet of a pipeline;

    c. KMGG may withhold its approval for the installation of trees and bushes for safety reasons or the convenient installation and maintenance of pipelines;

    d. KMGG shall *not* be liable for damages to the trails, grasses, bushes or trees caused in whole or in part by their pipeline operations;

    e. KMGG will be responsible for all costs of relocation and removal of *Segment 3A*. (Paragraph E)

ii. Regarding *Segment 3B* as depicted on **Exhibit B:**

    a. Surface Owner must prepare a landscape plan for review and reasonable approval by KMGG. Bushes will be preferred over trees; and trees and bushes may not be located on the surface of the pipeline easement area within 5 feet of a pipeline;

    b. KMGG may withhold its approval for the installation of trees and bushes for safety reasons or the convenient installation and maintenance of pipelines, but KMGG must propose reasonable alternatives when withholding consent to the landscape plan;

    c. KMGG shall be liable for damages to the trails, grasses, bushes or trees caused in whole or in part by their pipeline operations.

iii. Generally, confirmation that Surface Owner may not require KMGG to further relocate or remove pipelines in the Easement 3 area unless the

Town or other governmental authority requires the change, in which case KMGG will be responsible for the work. (Paragraph E)

d. **Easement 4:** Easement Deed dated June 2, 1993, and recorded June 8, 1993, Book 1386, Reception No. 02336128, to be amended to provide the following:

i. Surface Owner will not require KMGG to relocate or remove the pipeline within the property covered by Easement 4, but if the Town of Erie or another governmental entity requires a change in the pipeline location, KMGG will be responsible for the work.

ii. Surface Owner may install grasses (but not trees or shrubs) and soft or hard surface trails over and across the Easement 4, subject to the following conditions:

a. If the right-of-way lines are located in an area adjacent to Weld County Road 5, the local jurisdiction may request Surface Owner to install trees or bushes within the pipeline easements located on the Property, and in that case Surface Owner must prepare a landscape plan for review and reasonable approval by KMGG. Bushes will be preferred over trees; and trees and bushes may not be located on the surface of the pipeline easement area within 5 feet of a pipeline;

b. KMGG may withhold its approval for the installation of trees and bushes for safety reasons or the convenient installation and maintenance of pipelines;

c. KMGG shall *not* be liable for damages to the trails, grasses, bushes or trees caused in whole or in part by the pipeline operations. (Paragraph F)

e. **Easement 5:** Right-of-Way Grant dated August 20, 2007, and recorded January 1, 2009, at Reception No. 3600584, to be amended to provide for the following:

i. Extension of the easement to run the entire length of the SE/4 of Section 8 adjacent to County Road 5.

ii. The right of KMGG to construct an additional pipeline according to one of two options:

1. Option 1: KMGG could construct the new pipeline along Weld county Road 5 between the existing pipelines constructed pursuant to Easement 3 and Easement 5, as amended, provided the new pipeline des not unreasonably interfere with Surface Owner's landscape plans in that section;

a. Surface Owner must prepare a landscape plan for review and reasonable approval by KMGG;

b. KMGG may withhold its approval for the installation of trees and bushes for safety reasons or the convenient installation and maintenance of pipelines, but KMGG must propose reasonable alternatives when withholding consent to the landscape plan;

c. KMGG shall be liable for damages to the trails, grasses, bushes or trees caused in whole or in part by their pipeline operations.

2. Option 2: KMGG could change the size of the existing 4-inch pipeline constructed under Easement 5, as amended, and construct an additional pipeline to the east of the easterly most pipeline constructed under Easement 3 (and Easements 3 and 5 would be further amended to reflect the exercise of this Option 2).

Surface Owner may install grasses (but not trees or shrubs) and soft or hard surface trails over and across the Easement 4, subject to the following conditions:

a. If the right-of-way lines are located in an area adjacent to Weld County Road 5, the local jurisdiction may request Surface Owner to install trees or bushes within the pipeline easements located on the Property, and in that case Surface Owner must prepare a landscape plan for review and reasonable approval by KMGG. Bushes will be preferred over trees; and trees and bushes may not be located on the surface of the pipeline easement area within 5 feet of a pipeline;

b. KMGG may withhold its approval for the installation of trees and bushes for safety reasons or the convenient installation and maintenance of pipelines;

c. KMGG shall *not* be liable for damages to the trails, grasses, bushes or trees caused in whole or in part by the pipeline operations. (Paragraph G)

II. **KMGG's Obligation to Relocate *Segment 1* Pipeline.** In consideration for the easement amendments listed above:

a. KMGG agrees to relocate at its sole cost the pipeline in *Segment 1* shown on **Exhibit B** to a mutually agreeable location within 18 months after the effective date of the Agreement. The preferred location for the easement runs from the well head to the southeast, connecting to the line in County Road 5.

b. If required by the Town of Erie, KMGG will remove, at its cost, the abandoned pipeline shown as *Segment 5* on **Exhibit B** within 12 months after the effective date of the Agreement and release of record the right-of-way for *Segment 5*. (Paragraph H)

III. **Conflicts between Documents.** The Agreement is not intended to modify any existing agreement between Surface Owner and mineral interest owners except as such other agreement may expressly provide. (Paragraph I)

IV. **Assignment**. The Agreement may be assigned in whole or in part.

V. **Arbitration**. In the event of any controversy or claim arising under the Agreement, the parties must arbitrate in Denver in proceedings administered by the American Arbitration Association.

VI. **Inquiry Regarding Prescriptive Easements.** Note, the Agreement recites that KMGG is the current owner of various land rights consisting of recorded ***and prescriptive*** rights-of-way and easements,...." The purchase and sale agreement calls for the seller to disclose all title matters not of record, and particular inquiry regarding these prescriptive rights would be appropriate.

Exhibit B to Letter Agreement

Existing Layout

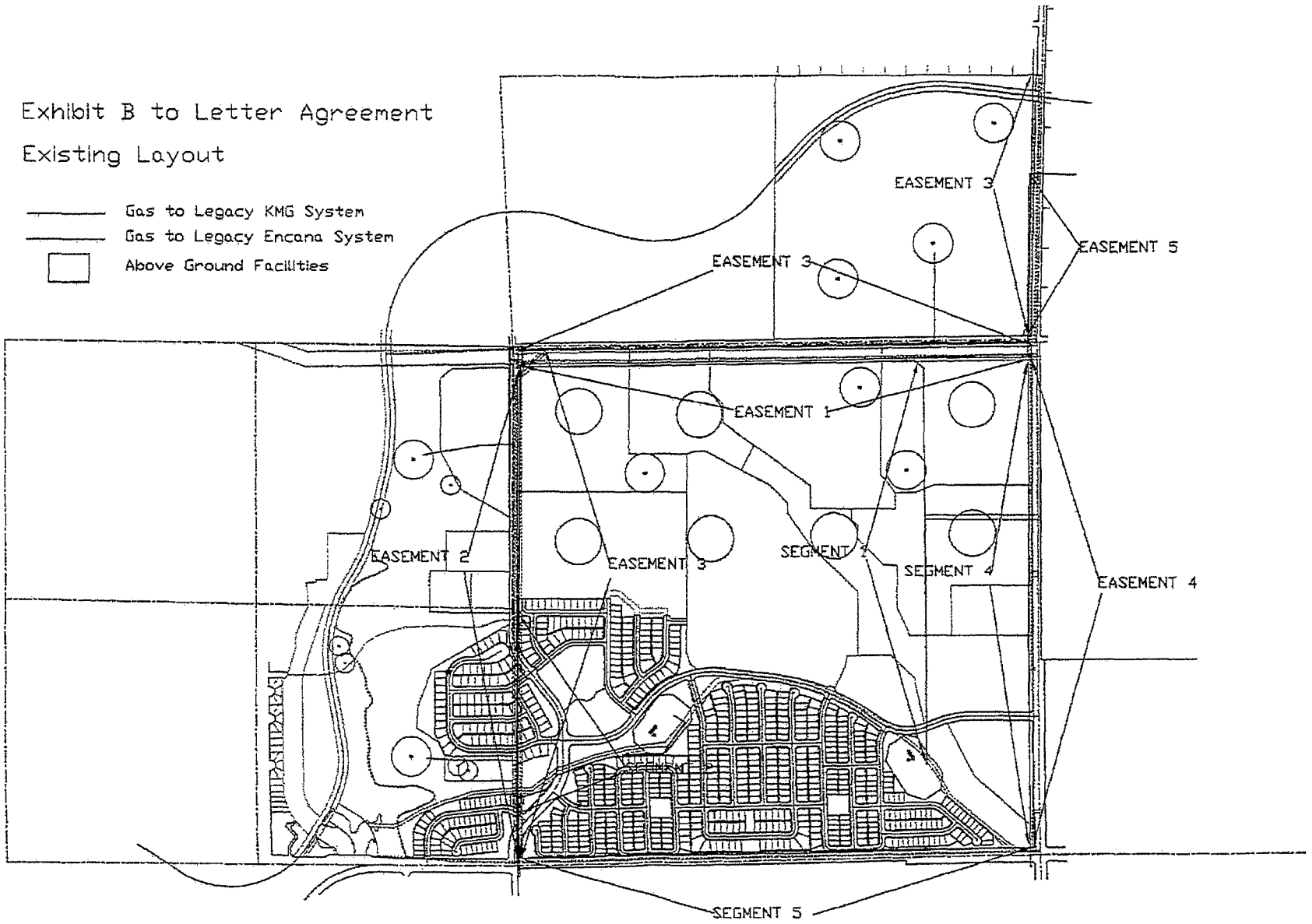


Exhibit B to Letter Agreement
Proposed Layout After Relocations

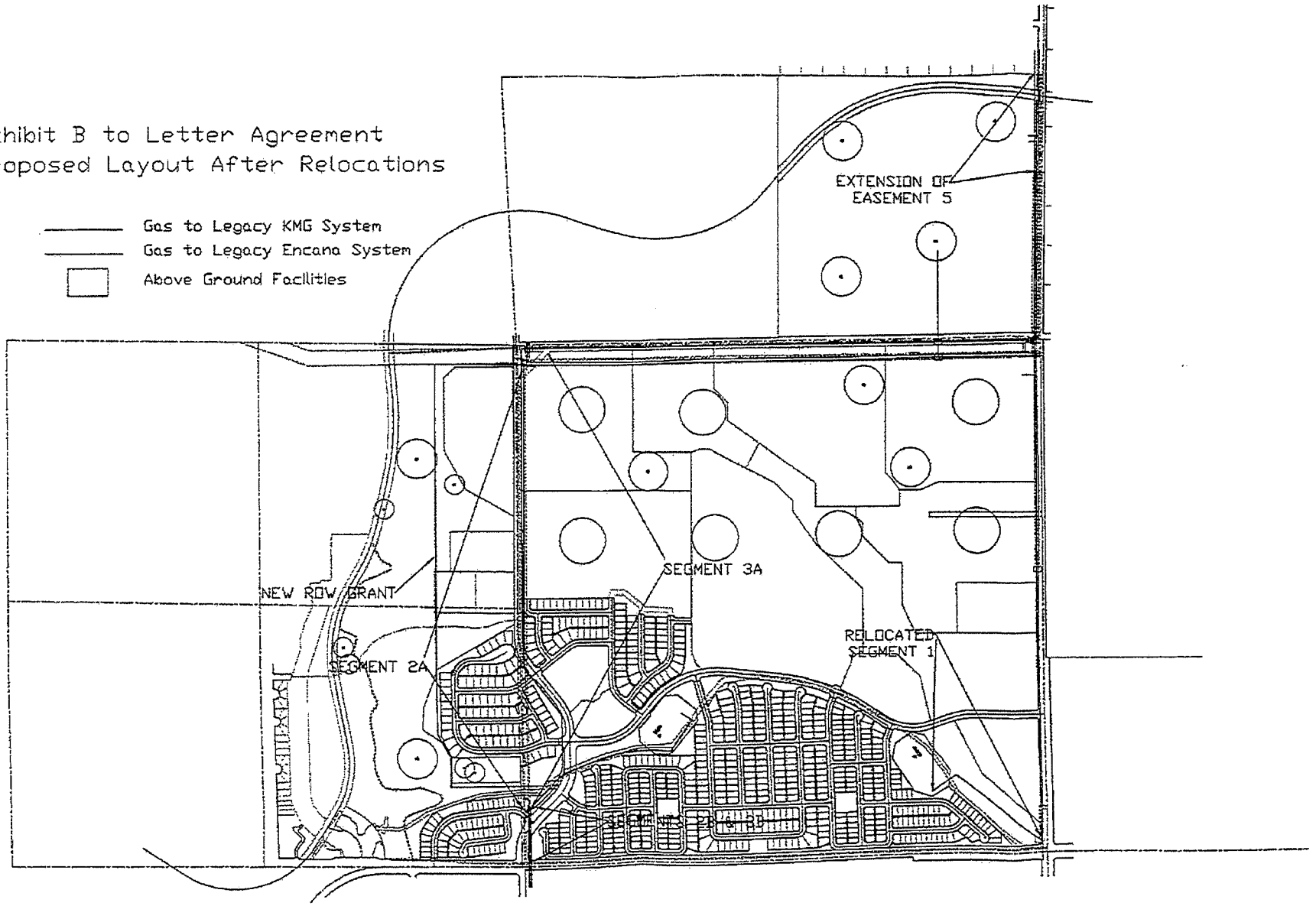
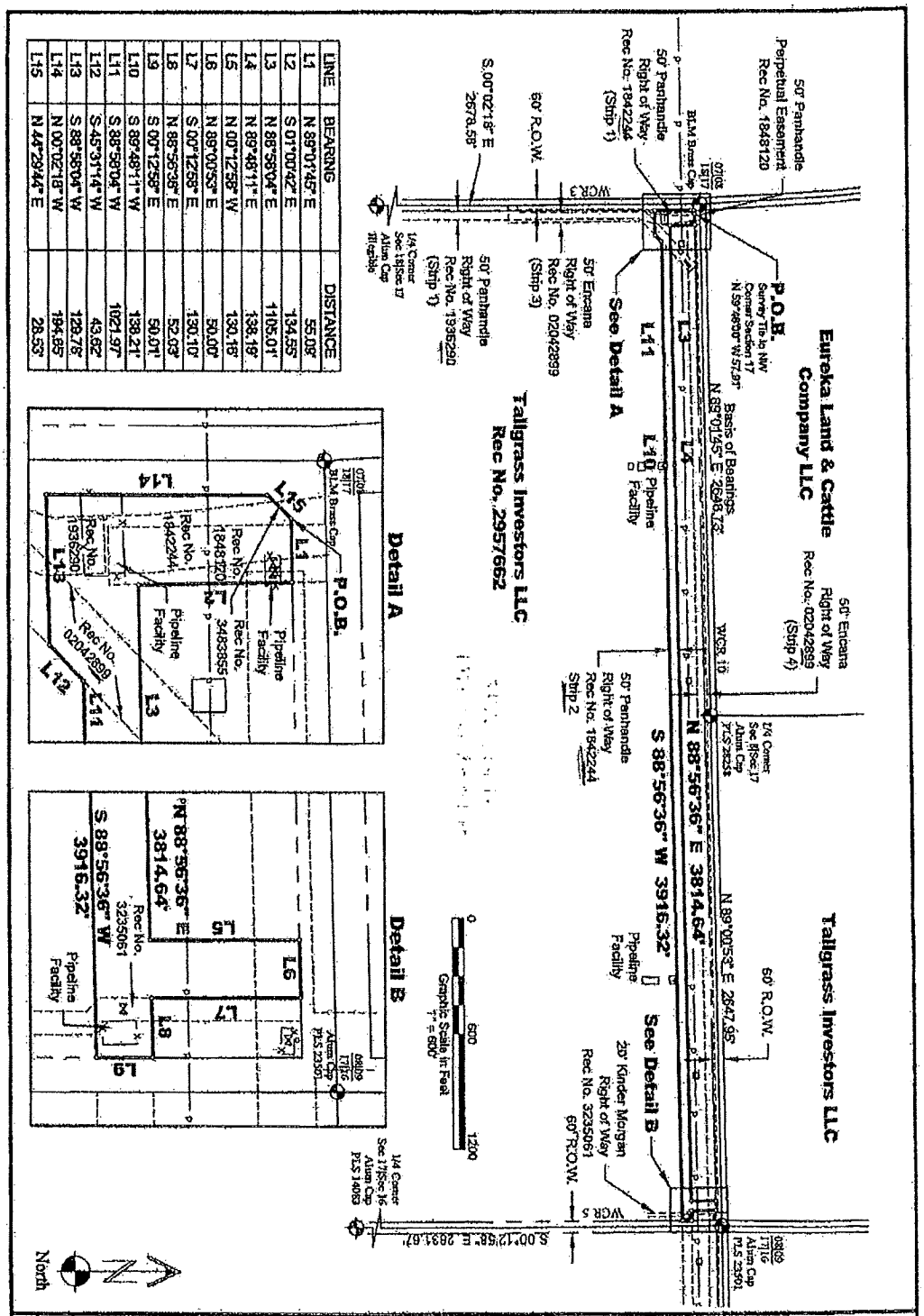


Exhibit C to Letter Agreement

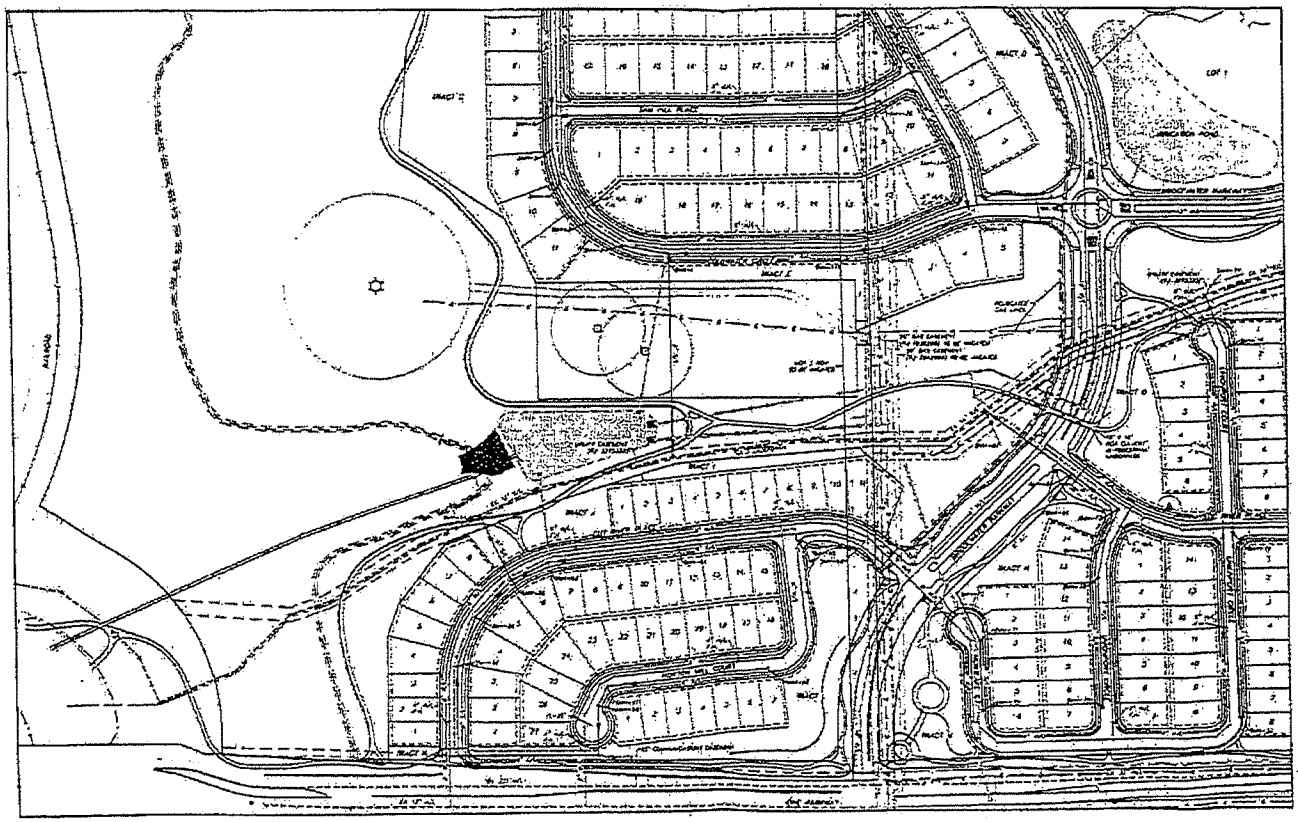


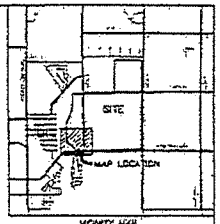
LINE	BEARING	DISTANCE
L1	N 89°01'45" E	55.08'
L2	S 01°00'42" E	134.55'
L3	N 88°58'04" E	1105.01'
L4	N 89°48'11" E	138.19'
L5	N 00°12'58" W	130.18'
L6	N 89°00'53" E	50.00'
L7	S 00°12'58" E	130.10'
L8	N 88°56'36" E	52.03'
L9	S 00°12'58" E	50.01'
L10	S 89°48'11" W	138.21'
L11	S 88°58'04" W	1021.97'
L12	S 45°31'14" W	43.62'
L13	S 88°58'04" W	129.78'
L14	N 00°02'18" W	194.85'
L15	N 44°29'44" E	28.53'

SHEET NO. 2 OF 2	GEO SURV LAND SURVEYING AND MAPPING LAFAYETTE - WINTER PARK	KERR-McGEE Right of Way Survey	TOWNSHIP: 1 North RANGE: 68 West 6th PM COUNTY: Weld STATE: Colorado	1"=600 7/22/2011 BY: jlv	SAP AFE: 2057749 TRACKING: REVISIONS:

BRIDGEWATER FILING NO. 1
PRELIMINARY UTILITY & GRADING PLAN

SHEET 3 OF 14





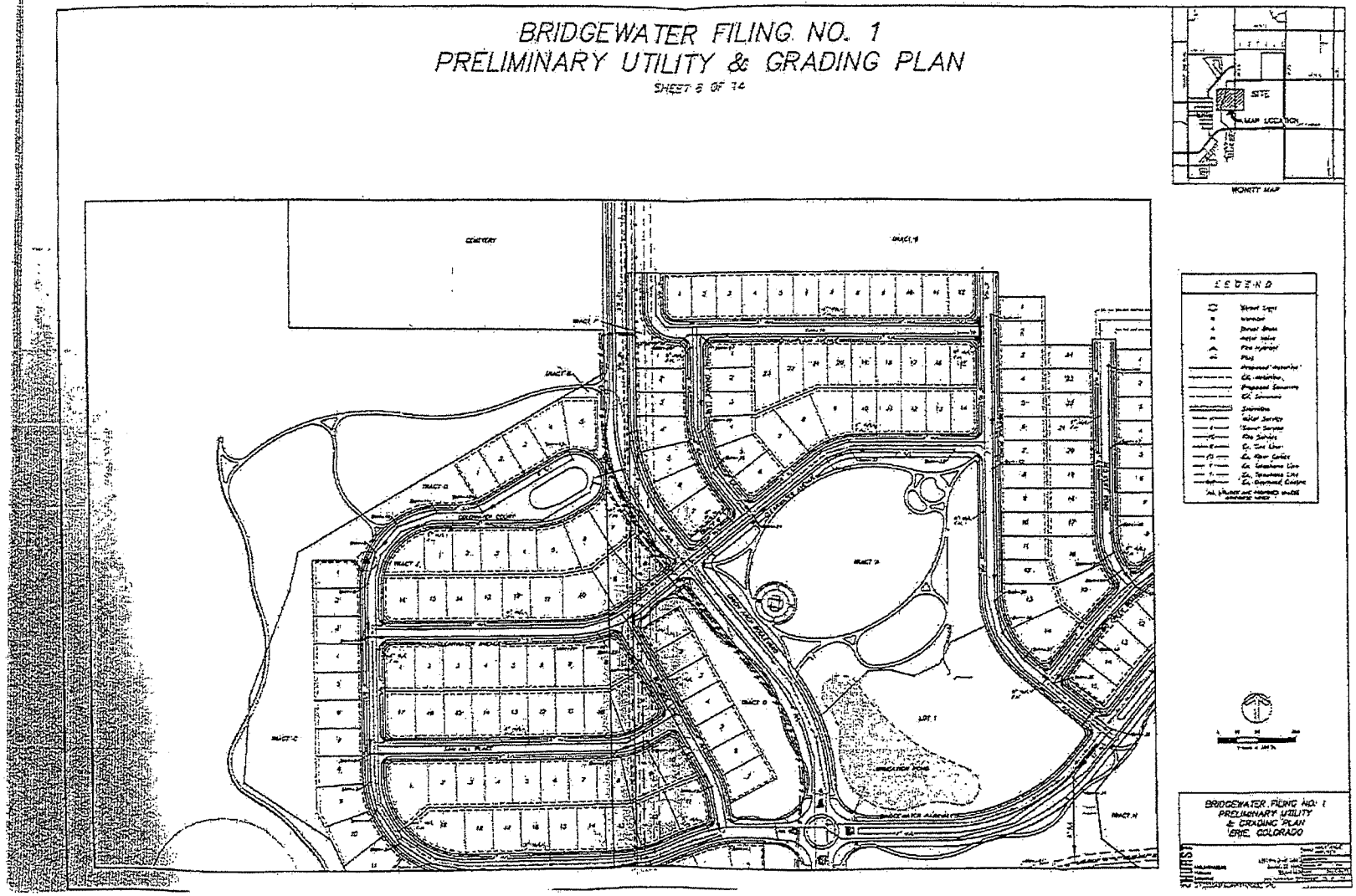
VICINITY MAP

LEGEND

BRIDGEWATER FILING NO. 1
PRELIMINARY UTILITY
& GRADING PLAN
ERIE, COLORADO

BRIDGEWATER FILING NO. 1
PRELIMINARY UTILITY & GRADING PLAN

SHEET 6 OF 14



Abstract of Surface Use Agreement

DayBreak Community, Weld County, Colorado
N/2 of Section 17, T1N, R68W

Effective Date: October 10, 2011

Recording Date/Info: November 14, 2011, Reception No. 3805168, Weld County, Colorado

Property: N/2 of Section 17, T1N, R68W

Parties:

Surface Owner:	Tallgrass Investors, LLC
Oil and Gas Mineral Interest Owners/Lessors:	Anadarko E&P Company LP, fka Union Pacific Resources Company, and Anadarko Land Corp., fka Union Pacific Land Resources Corporation (together, the **Anadarko Entities**)
Pipeline/Gas Gathering Company:	Kerr-McGee Gathering LLC (or **KMGG**)
Oil and Gas Mineral Interest Lessee:	Noble Energy, Inc. (**Noble**)

SUA Supplemented by: Letter Agreement dated October 10, 2011, among Surface Owner and Oil Companies

Abbreviations and Notes:

All number references in parentheses identify the sections of the Surface Use Agreement (**SUA**) under discussion. Consistent with the SUA, the abstract defines the Anadarko Entities and Noble, collectively, as the **Oil Companies**; and the Colorado Oil and Gas Conservation Commission as the **COGCC**.

SUA Summary:

I. **O&G Activity Areas**

The SUA identifies various areas of the Property according to the types of O&G activity allowed in the particular areas.

a. **Oil and Gas Operations Areas.**

i. O&G Companies' Permitted Uses/Restrictions.

1. O&G Wells: The Oil and Gas Operations Areas define the locations of certain Existing Wells (listed in subpart ii of this subpart I.a below) and any future O&G wells that may be developed on the Property. (1.a ; 1.b.(i); 1.f)

2. Exclusive Use: The Oil and Gas Operations Areas are designated for the exclusive use of the Oil Companies. (1.a and 1.f)

3. Permitted Uses: The location of Existing Wells and future wells and the conduct of oil and gas drilling, exploration, completion, recompletion, work-overs, fractures, refractures, plugging and abandonment activities; production and maintenance operations; the location, operation, maintenance and repair of associated oil field exploration and production equipment and facilities, including flowlines, pipelines and meters; and tanks, separators, dehydrators and compressors as necessary or convenient for the operation of (i) Existing Wells and future wells located within the Oil and Gas Operations Area and (ii) Production Facility Locations. (1.a, 1.f and 1.g)

ii. Site Locations and Sizes. The SUA describes **four** Oil and Gas Operations Areas, all shown on **Exhibit 2**, a copy of which is attached to this summary.

1. **Center of the NE/4**, which is the site of the Existing Well operated by Noble and called "East Erie #1-17," sized as shown on **Exhibit 2**. This Oil and Gas Operations Area includes (a) an "Oil and Gas Well Area," marking the site of the Existing Well and any future well, and (b) an "Oil and Gas Permanent Facilities Area," marking the location for permanent production facilities. (Recital F; 1.a; 1.b.(ii))

2. **Center of the NW/4**, which is the site of the Existing Well operated by Noble and called "East Erie 2-17 #1," sized as shown on **Exhibit 2**. (Recital F; 1.a)

3. **Center of the NW/4 NE/4**, which is the site of the Existing Well operated by Noble and called "Tallgrass 31-17" encompassing a circle with a radius of 200 feet. *Noble agreed that it will not drill new wells or locate new additional permanent production facilities within this Oil and Gas Operations Area.* In addition, at the written request of Surface Owner, the Oil Companies agree to negotiate in good faith regarding the plugging and abandonment of the Tallgrass 31-17 Well, provided that Noble determines in its sole discretion, and in consultation with the Anadarko Entities, the terms under

which it will agree to plug and abandon the Tallgrass 31-17 Well. (Recital F, 1.a, and 1.d; Supplemental Letter Agreement dated October 10, 2011)

4. **"Northeast Location," along east section line of the NE/4**, measuring 660 by 660 feet. This particular Oil and Gas Operations Area includes (a) an **Oil and Gas Permanent Facilities Area** for wells and equipment and (b) a **Temporary Drilling Area** (depicted on **Exhibit 2**) for operations related to the preparation, drilling and completion of horizontal wells and for the temporary location of production facilities for horizontal wells. (Recital F; 1.b.(ii) and (iii))

iii. Surface Owner's Restrictions and Covenants Regarding Oil and Gas Operations Areas.

1. Prohibited: Surface Owner may not plat lot lines for surface development, or construct or install any permanent or temporary building, structure or other improvement within or under the Oil and Gas Operations Areas.

2. Permitted: Surface Owner may install berms, screening, shrubs, perimeter fencing and irrigation systems adjacent to (but not within) the perimeter of the Oil and Gas Operations Areas, provided that (a) in the reasonable opinion of the Oil Company, the improvements do not impede present or future O&G operations, and (b) the Oil Companies aren't liable for damage to such installations because of the O&G operations on the Property.

3. No Public Access: Surface Owner is to cooperate with the Oil Companies to restrict public access during O&G operations in an Oil and Gas Operations Area. (1.e)

b. Temporary Drilling Area.

i. Location: Within the Oil and Gas Operations Area called the "Northeast Location."

ii. Use: No wells or permanent production facilities are allowed. The SUA permits only temporary uses relating to the drilling and completion of horizontal wells and the temporary location of production facilities.

iii. Expiration: The Oil Companies' right to use the Temporary Drilling Area expires on the *later* of (a) October 10, 2021, or (b) the commencement of construction on a building within a platted lot within the Northeast Location (NE/4 of Section 17). If the construction commencement milestone in clause (b) is the later date, Surface Owner must give the Oil Companies 90 days' advance written notice that construction will begin, and the Oil Companies shall move any production facilities located within the

Temporary Drilling Area within 60 days after that notice. (1.b.(iii) and 1.e(ii))

iv. Surface Owner's Use and Development: Surface Owner may plat the surface of the Temporary Drilling Area. However, until the expiration of the Oil Companies' right to use the Temporary Drilling Area (as explained in paragraph iii immediately above), Surface Owner may not construct or install permanent or temporary buildings or other improvements, or berms, screening, shrubs, perimeter fencing or irrigation systems within the Temporary Drilling Area.

c. **Production Facility Locations** (1.c and 1.g).

i. O&G Companies' Permitted Uses: For the construction, operation, location, maintenance and repair of drilling and production facilities and equipment, including tanks, separators, dehydrators, compressors, pipelines, flowlines and meters and other associated oil field equipment necessary or convenient for the operation and production of Existing Wells and future wells. (This use is also permitted in the four Oil and Gas Operations Areas described above.)

ii. Locations: The SUA describes two separate Production Facility Locations by reference to **Exhibit 2**. Each location consists of a circle with a radius of 200 feet.

iii. O&G Operator's Development of Production Facility Locations.

1. Existing Facilities: Noble may replace and maintain existing facilities in a Production Facility Location.

2. New Facilities: In developing any new wells in any location *other than* the Northeast Location, Noble may install new facilities in a Production Facility Location.

3. Restrictions on Noble's Development of Production Facility Locations at Requirement and Cost of Surface Owner:

a. New Facilities. Surface Owner may require that new production facilities be installed within an Oil and Gas Operations Area, as opposed to a Production Facility Location, *only if Surface Owner undertakes the following obligations:*

i. Surface Owner pays Noble and/or KMGG, as the case may be, all costs associated with the installation of the facilities in the Oil and Gas Operations Area that Noble or KMGG would not

have incurred had the facilities been installed in a Production Facility Location (including, without limitation, costs for gathering lines, meter stations and hook-up fees); and

ii. *Surface Owner grants KMGG a pipeline right-of-way at the location depicted* on **Exhibit 2** and in the form of **Exhibit 3** to the SUA.

b. Relocating Facilities. Surface Owner may require that facilities within a Production Facility Location be relocated to any Oil and Gas Operations Area (selected in Noble's discretion) following 60 days' advance notice to Noble and the payment by Surface Owner of all relocation costs, including (without limitation) costs of gathering lines, meter stations and hook-up fees.

iv. Surface Owner's Restrictions and Covenants Regarding Use of Production Location Facilities. The same prohibitions, permitted uses and covenants that apply to Surface Owner's use of Oil and Gas Operations Areas also apply to Production Facility Locations. (1.e)

II. **Access to Oil and Gas Operations Areas and Production Facility Locations**.

a. Oil Companies' Access Rights. The Oil Companies have the right to access Oil and Gas Operations Areas and Production Facility Locations as shown on **Exhibit 2**, (i) over existing routes currently in use, and (ii) over future access routes, when and if constructed. (2.a)

b. Changes in Routes During Surface Development. The parties may agree to different access routes on temporary or permanent bases, provided that Surface Owner pays all costs and expenses of relocating the routes. (2.a and 2.b)

c. Other Obligations and Costs for Surface Owner.

i. Joint Access Roads. (2.c and 2.d(1))

1. Construction. Surface Owner must construct or improve all paved or improved access roads that are jointly used by both Surface Owner or its subdivision occupants and the Oil Companies to be 30 feet or more in width, and to withstand the weight of oil field equipment (104,000 pounds, and 26,000 pounds per axle).

2. Maintenance. Surface Owner must maintain jointly used roads in good condition and repair until they are dedicated, but if an Oil Company causes damage to a road built to the specifications above, the Oil Company must pay for the repairs.

ii. Curb Cuts. Surface Owner must obtain and pay the cost of obtaining permits for curb cuts, 40 feet in width, as deemed necessary by the Oil Companies. (2.e)

d. **Oil Companies' Obligations for Oil Company Roads**. The Oil Companies must maintain any access roads reserved and used for their exclusive access, according to standards imposed by the COGCC. (2.d(2))

III. Pipelines, Flowlines and Pipeline Easements.

a. **Existing Lines.** The Oil Companies have the right to continue use, maintenance, repair and replacement of existing lines and easements, as shown on **Exhibit 2**. (3.a)

b. **Lines for Future Wells.** The oil companies have the right to use lines as shown on **Exhibit 2** that will serve future wells, and Surface Owner must grant written easements for such use on the form of **Exhibit 3** without cost to the Oil Companies. That form of Right-of-Way Grant (i) requires the grantee to lay pipe at a depth of at least 36 inches, (ii) prohibits the grantor from constructing on the easements without the grantee's consent, and (iii) obligates the grantee to indemnify the grantor for claims arising from the grantee's activities on the easement areas. (3.b)

c. **Relocation of Lines**. The Oil Companies and Surface Owner may agree to relocate lines and easements, but if Surface Owner requests the relocation, Surface Owner must pay the associated costs. (3.c)

d. **Surface Owner's Installations Underground.** Surface Owner may cross the Oil Companies' pipeline easements at approximately right angles and install and maintain access to those easements for (i) utility lines and (ii) other purposes with the applicable Oil Company's permission, not to be unreasonably withheld. The SUA includes minimum distance requirements between the Oil Company's installations and Surface Owner's installations underground. (3.e)

e. **Surface Owner's Installations on the Surface.** Surface Owner may install grasses (but not trees or shrubs) and non-permanent soft surface trails over and across pipeline easements, and paved surface trails that cross pipeline easements at generally right angles, subject to the following conditions:

i. Landscaping Along County Roads. The Town of Erie may request Surface Owner to install trees or bushes within the pipeline easements located on the Property and adjacent to Weld County Road 3 or Weld County Road 5, and Surface Owner must prepare a landscape plan for review and reasonable approval by KMGG (based on considerations such as safety issues and KMGG's ability to access the pipelines). Bushes will be preferred over trees; and trees and bushes may not be located on the surface of the pipeline easement area within 10 feet of a pipeline.

ii. Oil Companies' Liability Disclaimer. The Oil Companies will not be liable for damages to the trails, grasses, bushes or trees caused in whole or in part by their O&G operations. (3.f)

f. Oil Companies' Safety and Continued Use Requirements.

i. Safety/Security Priority. The Oil Companies may limit the use of pipeline easements by Surface Owner and its grantees for safety or security reasons.

ii. Surface Owner's Costs. Surface Owner must pay the Oil Companies all costs and expenses incurred to encase or lower pipelines and flowlines, as the Oil Companies determine reasonably necessary, to the extent those lines intersect and underlie any improvement permitted on the surface.

iii. No Interference with Pipeline Use. The Oil Companies' use of the flowlines and pipelines may not be prohibited at any time.

iv. Oil Companies' Liability Disclaimer. The Oil Companies shall not be liable for damage caused by O&G operations to improvements, landscaping, utilities or facilities permitted to be installed within or adjacent to pipeline easements. (3.g)

g. Specifications. The SUA includes specifications for pipeline and flowlines easements and installations, including installations by Surface Owner within the vicinity of the Oil Companies' lines. (3.d, 3.e and 3.h)

IV. Surface Development Requirements and Restrictions.

a. Notice of Public Hearings. Surface Owner must give the Oil Companies at least 30 days' notice before each hearing in the Town of Erie or in Weld County for the approval of a plat application or other land use application. (18)

b. Notices by Surface Owner. Surface Owner must give the Oil Companies at least 14 days' advance notice before beginning to pave current and future streets and access routes, so that the Oil Companies may lay new lines that cross under the streets or other routes. If Surface Owner fails to give the notice, the Oil Companies may bore under the paved street or route, at the cost of Surface Owner. Surface Owner must also give advance notice to and meet with representatives of the appropriate Oil Companies to locate existing lines and coordinate surface construction activities with then current and future O&G operations. (3.i and 4)

c. Notices by Oil Companies An Oil Company proposing drilling activities on the Property must give Surface Owner advance notice in accordance with the rules of the COGCC. (4)

d. Subdivision Plat Requirements. Surface Owner must identify the Oil and Gas Operations Areas, Production Facility Locations and all present and future access routes and pipeline easements on Surface Owner's subdivision plats and

applications for development. The plats must recite certain restrictions regarding the improvements allowed around those areas, as set forth in the SUA. (6)

e. **Waiver of Setback and Other Requirements**. Acknowledging that the COGCC has rules and regulations regarding the distance between a wellhead and other installations and improvements, Surface Owner has waived all setback requirements in COGCC Rule 603 and other state or local setback requirements that are inconsistent with the SUA or the exercise of the rights of the Oil Companies under it. (8)

f. **Pipeline Depth Investigation**. If the surface development plans call for roadways to cross over existing pipelines, Surface Owner must pothole or request the Oil Companies to pothole the existing and future pipelines to check the line depth. Surface Owner must pay the Oil Companies the reasonable cost of inspecting, and if necessary, lowering the pipelines, and the reasonable cost of any sub-grade work required to meet the road construction specifications. (3.j)

g. **Kerr-McGee Guidelines.** Surface Owner is to comply with "General Guidelines for Design and Construction Activities On or Near Kerr-McGee Gathering LLC and Kerr-McGee Rocky Mountain Corporation Pipelines and Related Facilities," attached as Exhibit 4 to the SUA. (14)

h. **Shut-In Production Payments**.

   i. Notice Requirement. Surface Owner must notify the applicable Oil Company at least 20 days before beginning construction activities with heavy equipment that crosses flowlines or pipelines or in locations adjacent to an Oil and Gas Operations Area. (5.a)

   ii. Payment Requirement. If an Oil Company reasonably decides for safety reasons to shut-in a line over which heavy equipment will be operated, or if Surface Owner requests such a shut-in, Surface Owner must pay the Oil Company the following:

      1. an amount for each day of the shut-in equal to the average daily production of the affected well for the preceding six months calculated on the basis of the days the well actually produced during the six-month period;
      2. any costs to rework the well in order to place it back in production; and
      3. any costs to replace pipelines and flowlines damaged by the surface construction activities. (5.a)

i. **Electrical Equipment Change Costs.** Surface Owner must pay any costs incurred by an Oil Company to change electrical equipment for an Oil and Gas Operations Area or Production Facility Location because of the surface development. (5.b)

j. **Road / Pipeline Relocation Costs.** If Surface Owner requests an Oil Company to relocate an access road or pipeline easement as allowed under Sections 2.b and 3.c of the SUA, Surface Owner must give the Oil Company at least 30 days' notice before the relocation. The Oil Company will provide Surface Owner with an estimate of the relocation costs within 30 days after that notice, and Surface Owner must pay the estimated costs within the next 10 days. Within a reasonable time after receipt of that payment and execution of a separate relocation agreement, the Oil Company will perform the relocation work. Upon completion, the Oil Company will provide Surface Owner with an accounting of the actual relocation costs, and the parties will true-up any shortfall or excess payment within 10 days after the accounting. (9)

k. ***Impact Mitigation***.

i. **Oil Companies' Obligations**. The Oil Companies must install, maintain and repair, at their sole cost, such fences, gates and locks around wells and production facilities as required by COGCC or the Town of Erie as a condition for a special use permit to drill wells. To the extent required by law, the Oil Companies must pay for impact mitigation measures, including environmental and hazardous materials clean-up and remediation, in connection with their operations. (12.a)

ii. **Surface Owner's Obligations**. Surface Owner must pay all costs to install such noise and visual impact mitigation measures required by Surface Owner, the Town of Erie or other local jurisdictions at or around the Oil and Gas Operations Areas and Production Facility Locations, to the extent those measures exceed COGCC regulations for areas which are not high density and which are required at the time of Surface Owner's application for development approval. The operator of a well within the particular Oil and Gas Operations Area or Production Facility may veto or protest the types and locations of impact mitigation measures for safety reasons. (12.b)

V. Surface Damage.

a. **Waiver by Surface Owner Regarding O&G Areas.** Surface Owner has waived all surface damage payments and other such payments for use of the Property pursuant to any current or future COGCC or local regulation, statute, common law or prior agreement, for every well drilled and every well site constructed within an Oil and Gas Operations Area and for all production facilities within an Oil and Gas Operations Area or a Production Facilities Location, for pipeline easements and access routes as depicted on **Exhibits 2A and 2B** (or relocated), and for the use of the Temporary Oil and Gas Operations Area. (7)

b. **Limited Use and Obligations for Other Surface Use by Oil Companies.** Apart from the Oil and Gas Operations Areas, the Production Facility Locations and the access roads and easements provided in the SUA, the use of the Property is off limits to the Oil Companies except in the event of an emergency or for reasonable, incidental, temporary and non-damaging activities. The particular Oil Company shall be strictly

and solely responsible for any damages that may occur in those limited, permitted uses. (13)

VI. **Development Agreement**.

The Union Pacific entities listed with the Anadarko Entities at the beginning of this summary (as predecessors in interest to the Anadarko Entities) and Weld county Land Company, LLC, executed an Agreement for Compatible Development dated November 14, 2000, and recorded November 17, 2000 at Reception No. 280715 (the **Development Agreement**). The Development Agreement contemplated that the owner of the surface of the Property might enter into surface use agreements in the future, and this SUA has been executed pursuant to the Development Agreement. If a provision of the SUA conflicts with the Development Agreement, the SUA controls the rights and obligations of the parties. To the extent the Development Agreement is not inconsistent with the SUA, the Development Agreement still applies to the parties. (Recitals; 17)

VII. Governmental Proceedings.

a. **No Objection by Surface Owner.** Surface Owner (i) must not object, and waives the right to object, in any forum to the use by the Oil Companies of the surface of the Property consistent with the SUA and the Development Agreement; (ii) must provide the Oil Companies with such waivers and approvals that are requested and consistent with the SUA; (iii) has waived any rights to require or request a surface inspection for proposed wells for the purpose of requesting that conditions be attached to the permit for the well; (iv) consents to multiple wells within an Oil and Gas Operations Area; and (v) has waived its rights to object or request conditions to a well permit or to request a hearing before the COGCC or to allege potential adverse impacts with respect to the wells allowed under the SUA. (10.a)

b. **No Objection by Oil Companies**. The Oil Companies have waived their right to object in any forum to a request by Surface Owner to zone or plat any of the Property, to the extent the request is consistent with the SUA. (10.b)

VIII. **Notice to Homebuilders and Home Buyers**.

Surface Owner must furnish all purchasers of any portion of the Property with an exhibit showing the location of the Oil and Gas Operations Areas, the Production Facility Locations, existing and future pipeline easements, and existing and future access routes. In addition, Surface Owner must provide all buyers with notice regarding the O&G operations on the Property and the binding effect of certain portions of the SUA, as particularly detailed in the SUA. (11)

EXHIBIT 2

3805168 11/14/2011 12:49P Weld County, CO
23 of 34 R 176.00 D 0.00 Steve Moreno Clerk & Recorder

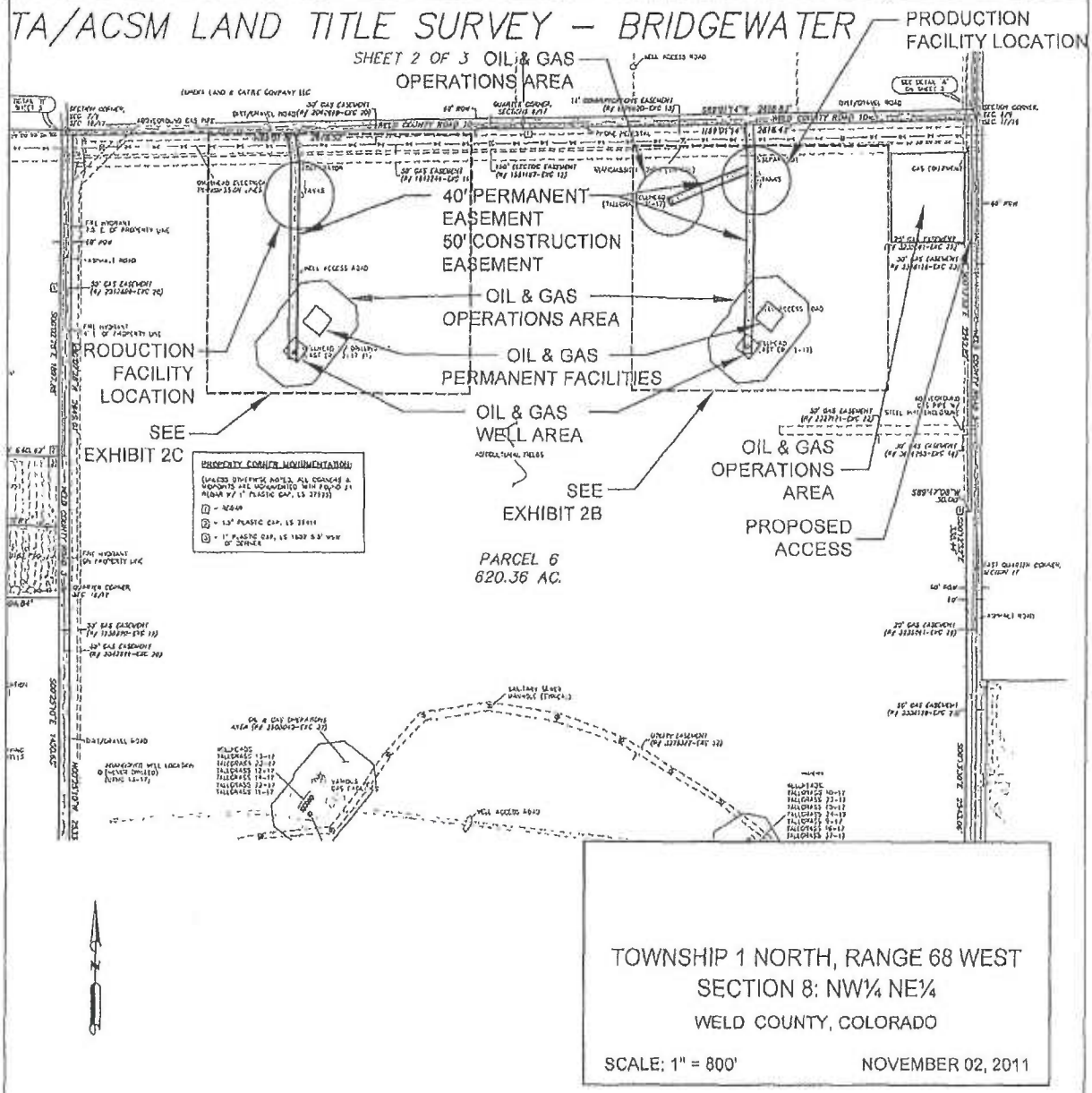
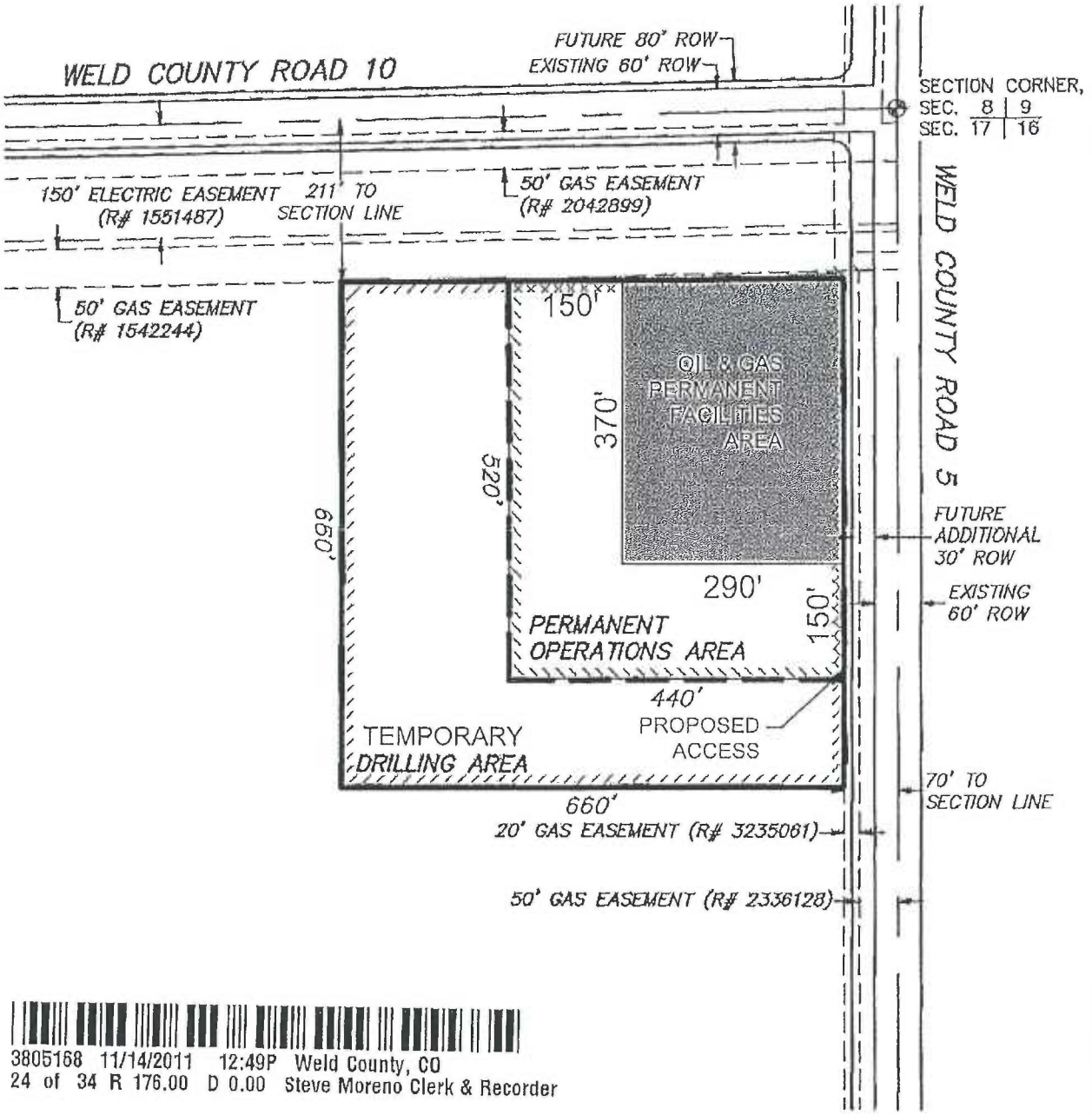


EXHIBIT 2A



0 100 200 400

1 inch = 200 ft.

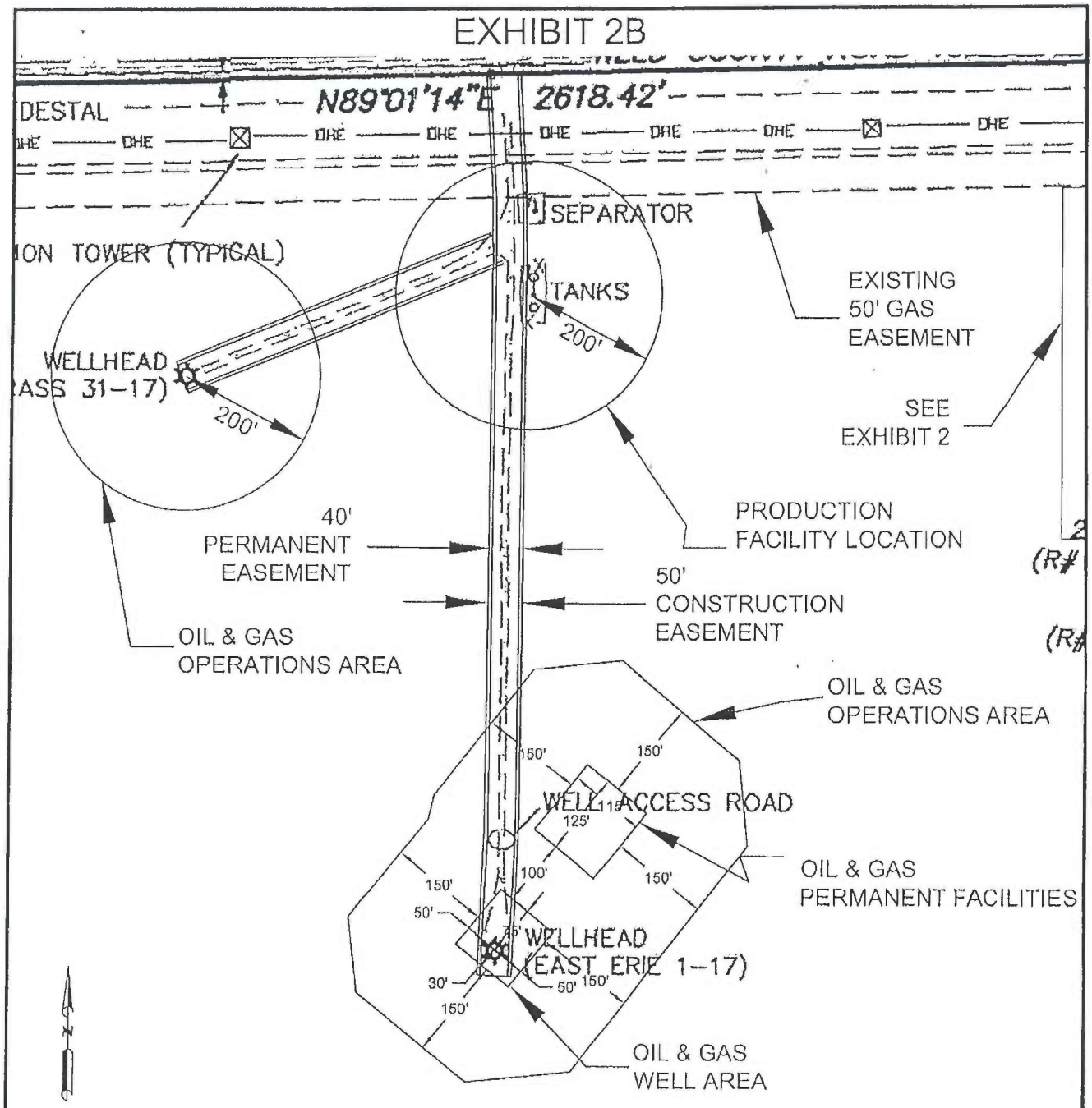
PROPOSED NOBLE
OIL & GAS OPERATIONS AREA
NE 1/4, SEC. 17, T1N, R68W
ERIE, COLORADO

HURST
1350 Pine Street, Suite
Boulder, CO 80302
303.449.9105
www.hurst-assoc.com

SCALE	HOR. 1"=200' VERT. N/A
DESIGN/APPR.	JJ
DRAWN BY	BD
DATE	09/20/11
SHEET	1 OF 1

FILE #: 2020423

EXHIBIT 2B

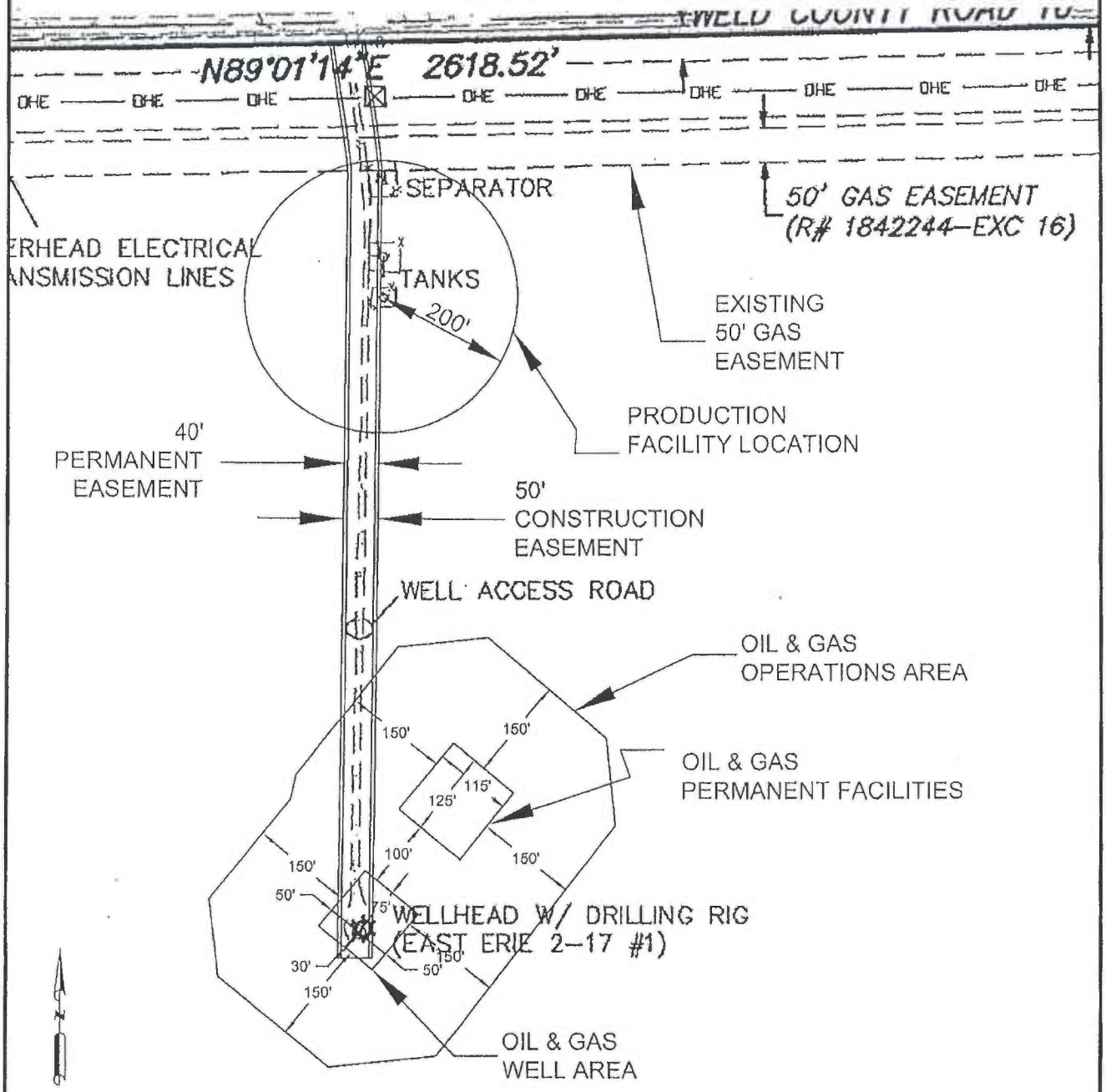


TOWNSHIP 1 NORTH, RANGE 68 WEST
SECTION 8: NE¼
WELD COUNTY, COLORADO

SCALE: 1" = 200' OCTOBER 24, 2011

3805168 11/14/2011 12:49P Weld County, CO
25 of 34 R 176.00 D 0.00 Steve Moreno Clerk & Recorder

EXHIBIT 2C



TOWNSHIP 1 NORTH, RANGE 68 WEST
SECTION 8: NW¼
WELD COUNTY, COLORADO

SCALE: 1" = 200' OCTOBER 24, 2011

3805168 11/14/2011 12:49P Weld County, CO
26 of 34 R 176.00 D 0.00 Steve Moreno Clerk & Recorder

3799568 10/18/2011 12:26P Weld County, CO
1 of 46 R 236.00 D 0.00 Steve Moreno Clerk & Recorder

SURFACE USE AGREEMENT

THIS SURFACE USE AGREEMENT ("Agreement') is effective this 27th day of September, 2011, by and among ANADARKO E&P COMPANY LP, formerly known as Union Pacific Resources Company, and ANADARKO LAND CORP., formerly known as Union Pacific Land Resources Corporation (together the "Anadarko Entities"), both with an address of Post Office Box 1330, Houston, Texas 77251-1330; KERR-McGEE OIL & GAS ONSHORE LP ("Kerr-McGee") with an address of 1099 18th Street, Suite 1800, Denver, Colorado 80202; KERR-McGEE GATHERING LLC ("KMGG"), also with an address of 1099 18th Street, Denver, Colorado 80202; and ENCANA OIL & GAS (USA) INC. ("Encana") with an address of 370 17th Street, Suite 1700, Denver, Colorado 80202 (the Anadarko Entities, Kerr-McGee and Encana are sometimes referred to hereinafter separately as an "Oil Company" or collectively as the "Oil Companies") and TALLGRASS INVESTORS, LLC ("Surface Owner") with an address of 2500 Arapahoe Avenue, Suite 220, Boulder, Colorado 80302.

A. Surface Owner owns the surface estate for property located within the Town of Erie ("Erie") in Weld County, Colorado, described as the E/2 of Section 18, Township 1 North, Range 68 West, which is more specifically described in the attached Exhibit 1A and hereinafter referred to as the "Section 18 Property."

B. Surface Owner also owns the surface estate for property located in Erie described as the SE/4 of Section 8, Township 1 North, Range 68 West, which is more specifically described in the attached Exhibit 1B and hereinafter referred to as the "Section 8 Property."

C. The Section 18 Property and the Section 8 Property are hereinafter referred to together as the "Property."

D. The Anadarko Entities own all of the oil and gas that underlies the Property, and either the Anadarko Entities, or their predecessors, have granted oil and gas leasehold rights in the Property. Interests in such leasehold rights have been assigned to Encana and Kerr-McGee, among other parties.

E. Union Pacific Land Resources Corporation and Union Pacific Resources Company (together the "Union Pacific entities") entered into an agreement with Weld County Land Company, LLC dated November 14, 2000, entitled "Agreement for Compatible Development" ("Development Agreement") pursuant to which the parties set forth minimum standards with which Surface Owner is required to comply to protect existing oil and gas wells on the Property and for the location of future oil and gas wells on the Property, among other things.

F. The Development Agreement was recorded in the Weld County Clerk and Recorder's Office on November 17, 2000, at Reception No. 280715.

G. The Development Agreement contemplated that Surface Owner might enter into surface use agreements in the future with the parties which own oil and gas leasehold interests in the Property to which the Union Pacific entities were required to be signatory parties.

H. Encana owns certain oil and gas leasehold interests in the Section 18 Property that it derived through the Union Pacific entities and operates two oil and/or gas wells on the Section 18 Property, one identified as the Erie Champlin B Unit #1 well, generally in the center of the NE/4, and the other identified as the Erie Champlin B Unit #2 well, generally in the center of the SE/4.

I. Predecessors to Encana and Kerr-McGee entered into a joint operating agreement pursuant to which Encana, as operator, drilled and operates five oil and/or gas wells on the Section 8 Property identified as the Woolley #43-8 in the NE/4SE/4, the Woolley #33-8 in the NW/4SE/4, the Woolley #34-8 in the SW/4SE/4, and the Woolley K Unit #1 and Woolley #44-8 in the center of the SE/4.

J. The wells identified in Recitals H. and I. are hereinafter referred to alone or together as an "Existing Well" or the "Existing Wells."

K. Kerr-McGee owns certain oil and gas leasehold interests in both the Section 18 Property and the Section 8 Property that it derived through the Union Pacific entities.

L. Encana and Kerr-McGee have rights to drill additional wells on the Property.

M. KMGG is an affiliate of the Anadarko Entities and Kerr-McGee and signs this Agreement only in its capacity as a party which gathers or may gather gas produced from the Property.

N. KMGG and Surface Owner shall enter into a letter agreement that is effective the same date as this Agreement in which KMGG and Surface Owner shall agree upon certain amendments to existing pipeline easements and right-of-way grants that cover portions of the Property and property adjacent to the Property in Section 17 and within the proposed Bridgewater development and hereinafter referred to as the "Letter Agreement."

O. This Agreement provides for the compatible development of the surface estate and the oil and gas estate for the Property and, with respect to each of the Oil Companies, applies only to the oil and gas interests and/or the oil and gas leasehold interests that each owns.

NOW THEREFORE, in consideration of the covenants and mutual promises set forth in this Agreement, including in the recitals, the parties agree as follows:

1. Oil and Gas Operations Areas.

a. Existing, Proposed, and Future Wellsite Locations. With respect to the Section 18 Property, the Oil Companies agree to locate future oil and gas wells only within the two areas that are identified on Exhibit 2A as the Oil and Gas Operations Areas and located generally in the centers of the NE/4 and the SE/4 of Section 18. With respect to the Section 8 Property, the Oil Companies agree to locate future oil and gas wells only within the four areas that are identified on Exhibit 2B as the Oil and Gas Operations Areas and located generally in the centers of the SE/4, NE/4SE/4, NW/4SE/4 and SW/4SE/4. The locations identified on Exhibit 2A and Exhibit 2B are hereinafter referred to separately or together as an "Oil and Gas Operations Area"

or the "Oil and Gas Operations Areas." The Oil and Gas Operations Areas shall be made available to the Oil Companies and their designated gas gatherer by Surface Owner for their exclusive use in their present condition for their oil and gas operations and the location of wells and equipment, flowlines and pipeline easements, as specifically provided for herein.

b. The Oil and Gas Operations Areas in Section 18 and the NE/4SE/4 of Section 8. Each Oil and Gas Operations Area in Section 18 and the Oil and Gas Operations Area in the NE/4SE/4 of Section 8 includes the property specifically identified and depicted on Exhibit 2A and Exhibit 2B as the: (aa) Oil and Gas Operations Area; (bb) Oil and Gas Well Area; (cc) Facilities Location; and (dd) Temporary Easement Area adjacent to the Oil and Gas Operations Area. The Temporary Easement Area and the areas within Oil and Gas Operations Areas are for oil and gas operations and the location of wells and equipment as follows:

(i) The Oil Companies may use the Temporary Easement Area for operations related to the preparation, drilling and completion of horizontal wells to be drilled at locations within an Oil and Gas Well Area within the Oil and Gas Operations Area and for the temporary location of production facilities for horizontal wells up until and only prior to the time that construction begins on a building within a platted lot within the quarter section where the Oil and Gas Operations Area is located (NE/4 or SE/4 of Section 18 or SE/4 of Section 8, as the case may be). The Oil Companies may not locate wells or permanent production facilities within the Temporary Easement Area, but may use the Temporary Easement Area only for temporary uses relating to the drilling and completion of horizontal wells and the temporary location of production facilities. The Oil Companies shall not use the Temporary Easement Area (except as provided herein) after construction begins on a building within a platted lot within the quarter section for the particular Oil and Gas Operations Area.

(ii) The Oil and Gas Operations Areas shall be the locations for oil and gas operations, Existing Wells and future wells and production facilities and flowlines and pipeline easements.

(iii) The Oil and Gas Well Areas shall be the locations for Existing Wells and additional future wells.

(iv) The Facilities Locations shall be the locations for permanent productions facilities that service the wells described in section 1.e.

(v) For each Temporary Easement Area, Surface Owner shall give the Oil Companies ninety (90) days advance written notice that it will commence the construction of a building within the applicable quarter section for the particular Oil and Gas Operations Area. The Oil Companies shall relocate any production facilities that are located within the Temporary Easement Area within sixty (60) days from the date of the notice.

(vi) In consideration of the covenants and promises contained in this Agreement and without in any way limiting section 1.e, Surface Owner specifically agrees that wells may be drilled by the Oil Companies from the Oil and Gas Operations Area in the SE/4 of Section 18 to bottomhole locations in the SW/4 of Section 18 and production facilities to service such wells located within the Oil and Gas Operations Area in the SE/4 of Section 18.

c. The Oil and Gas Operations Areas in Section 8 Other than the NE/4SE/4 Location. Each Oil and Gas Operations Area in Section 8 other than the Oil and Gas Operations Area in the NE/4SE/4 of Section 8 shall be the size and configuration depicted on Exhibit 2B and shall be available for oil and gas operations and the location of wells and production facilities, flowlines and pipeline easements.

d. Surface Lot Line Requirements. Lot lines for surface development shall not be platted anywhere within the Oil and Gas Operations Areas, and Surface Owner shall not construct or install any permanent or temporary building, structure or other improvement within or under the Oil and Gas Operations Areas; provided, however, Surface Owner may install berms, screening, shrubs, perimeter fencing and irrigation systems adjacent to (but not within) the perimeter of the Oil and Gas Operations Areas; provided that, in the reasonable opinion of the Oil Company, such improvements do not in any way impede or interfere with present or future oil and gas operations; and, provided, further, that the Oil Companies shall not be liable for damage or injury to such berms, screening, shrubs, perimeter fencing or irrigation systems that in any way occurs because of or results from oil and gas operations on the Property. Further, upon prior notice from the Oil Company, Surface Owner shall cooperate with the applicable Oil Company to insure that improvements are restricted from public access during oil and gas operations within an Oil and Gas Operations Area that require the use of heavy equipment by the Oil Company.

e. Multiple Wells within Oil and Gas Operations Areas. The Oil Companies shall continue to have the right to operate and maintain the Existing Wells and to drill, complete, operate and maintain additional wells within the Oil and Gas Operations Areas (as described herein), including vertical, twinned, replacement, directional and horizontal wells (with bottomhole locations within and outside the Property) that produce from and drain the Property as well as lands other than the Property. The Oil Companies shall have the right to deepen, complete, recomplete, workover, fracture, refracture and plug and abandon the Existing Wells and any well that is drilled in the future; provided, however, Encana agrees to permanently plug and abandon the Existing Erie Champlin B Unit #2 Well on the Section 18 Property prior to commencing drilling operations for any future well within the Section 18 Property. The Oil and Gas Operations Areas shall be for the exclusive use of oil and gas drilling, exploration, completion, recompletion, production and maintenance operations and for the location of associated oil field exploration and production equipment and facilities (including pipelines and flowlines) necessary or convenient for the operation of a well or wells located within an Oil and Gas Operations Area. Surface Owner acknowledges and understands that: i) any wells shown on the exhibits are those existing or currently planned; ii) the Oil Companies shall not be limited or restricted to the drilling of only the depicted wells or types of wells; and (iii) the actual wells drilled, including the number and their type, may differ from those shown, as may be determined by the Oil Companies in their discretion.

f. Associated Drilling and Production Equipment. The Oil Companies shall have the right to construct, operate, locate, maintain and repair such associated drilling and production equipment, including tanks, separators, dehydrators, compressors, pipelines, flowlines and meters, and also any other associated oil field equipment necessary or convenient for the operation and production of the Existing Wells, proposed wells, and future wells within the Oil and Gas Operations Areas in the Section 8 Property and within the Facility Locations within the

Oil and Gas Operations Areas in the Section 18 Property and the NE/4SE/4 of the Section 8 Property. The Oil Companies agree to install low profile tanks for future operations; provided, however, Encana shall not be required to replace the equipment that is currently located on the Property that services the Existing Wells.

2. Access to Oil and Gas Operations Areas.

a. Access to Oil and Gas Operations Areas. Surface Owner acknowledges and understands that the Oil Companies have the right to continue to use the existing access routes that they are currently utilizing and the additional proposed access (when and if constructed) to access the Oil and Gas Operations Areas as identified on Exhibit 2A and Exhibit 2B. During surface construction by Surface Owner on pertinent portions of the Property, the parties may mutually agree upon different access routes to an Oil and Gas Operations Area and thereafter to permanent access routes; provided, however, all costs and expenses for a relocation to temporary access routes and permanent access routes shall be borne by Surface Owner; and provided, further, the Oil Companies shall at all times have access to the Oil and Gas Operations Areas and pipeline easements.

b. Relocation of Access. Access to an Oil and Gas Operations Area may be changed in the future by mutual agreement of the affected parties or their successors in interest; provided however, all costs and expenses for such relocations shall be borne by Surface Owner, if the relocation is requested by Surface Owner.

c. Maintenance and Use of Joint Access Roads. Surface Owner shall keep roads jointly used by both Surface Owner or its subdivision occupants and one or more of the Oil Companies in good condition and repair until they are dedicated to a local jurisdiction; provided, however, if an Oil Company causes damage to a road that is built to the specifications in section 2.d.(1), it agrees to promptly repair any damage that it causes that is a direct result of its use of the road. No party shall unreasonably interfere with the use by the other of an access road.

d. Construction and Width of Access Roads.

(1) Access roads that are jointly used by the Oil Companies and Surface Owner shall be thirty (30) feet or more in width, and Surface Owner shall construct or improve all paved or improved access roads so as to withstand the weight of oilfield equipment. Specifically, Surface Owner shall construct the roads so that they can be used to withstand the weight of 104,000 pounds and 26,000 pounds per axle.

(2) Access roads that are used exclusively by the Oil Companies shall be generally thirty (30) feet in width, and the Oil Companies shall install and maintain them to applicable standards of the Colorado Oil and Gas Conservation Commission ("COGCC"). The Oil Companies shall be solely responsible for the maintenance of those portions of access roads that are used exclusively by the Oil Companies.

e. Surface Owner agrees that it will obtain and pay the costs to obtain from the local jurisdiction, permits for curb cuts as deemed necessary by the Oil Companies. Said curb cuts shall be forty (40) feet in width.

3. Pipelines, Flowlines and Pipeline Easements.

a. Pipelines, Flowlines and Pipeline Easements for Existing Wells. Surface Owner acknowledges and understands that the Oil Companies and their affiliates have the right to continue to use the flowlines, pipelines and pipeline easements that they are currently utilizing to service the Existing Wells and to construct, repair, maintain and replace the flowlines and pipelines. The locations for pipelines and flowlines that service Existing Wells that are located outside Oil and Gas Operations Areas are depicted on Exhibit 2A and Exhibit 2B.

b. Relocation or Abandonment of Existing Pipelines within Section 18 Property. With respect to the Section 18 Property, KMGG agrees to abandon in place, in accordance with COGCC Rules and Regulations, the pipeline that currently gathers the gas from the Erie Champlin B Unit #1 Well ("Champlin #1 Well") in the NE/4 of Section 18 and labeled as "proposed NE/4 abandoned gathering line" on Exhibit 2A. The parties acknowledge and understand that the proposed NE/4 abandoned gathering line will not be abandoned until the pipeline is constructed and operational on the Section 18 Property in the west portion of the property and depicted on Exhibit 2A as the "Future Pipeline Easement." KMGG also agrees to abandon in place or to relocate, as provided herein, the pipeline that currently gathers gas from the Erie Champlin B Unit #2 Well ("Champlin #2 Well") in the SE/4 of Section 18 and labeled as "proposed SE/4 abandoned or relocated gathering line" on Exhibit 2A. The parties acknowledge and understand that the proposed SE/4 abandoned or relocated gathering line will not be abandoned or relocated until Encana plugs and abandons the Champlin #2 Well and the initial pipeline is constructed and in operation in the Future Pipeline Easement. The proposed abandoned gathering lines and any relocated pipeline shall be abandoned and installed by KMGG pursuant to a separate pipeline relocation agreement in the form attached hereto as Exhibit 3.

c. Pipelines, Flowlines and Pipeline Easements for Future Wells. Pipelines and pipeline easements and also flowlines (to the extent located outside Oil and Gas Operations Areas) that service future wells shall be at the locations identified on Exhibit 2A and Exhibit 2B, or as the parties may otherwise agree, and Surface Owner shall grant the Oil Companies, or KMGG, as directed by the Oil Companies, written pipeline easements for production from the Property and other lands upon the request of the Oil Companies and at no cost to them in the form of right-of-way grant attached hereto as Exhibit 4.

d. Relocation of Pipelines and Pipeline Easements. Locations of pipelines and pipeline easements may be changed by mutual agreement of Surface Owner and the appropriate Oil Company pursuant to a separate pipeline relocation agreement; provided, however, all costs and expenses of such relocations shall be borne by Surface Owner, if the relocation is requested by Surface Owner.

e. Width and Grant of Pipeline and Flowline Easements. Pipeline easements may be nonexclusive as provided in Section 3.f. For pipeline easements in Section 8, if pipelines are relocated, and for initial installation, pipeline easements shall in all cases be fifty (50) feet in width during construction activities and reduced to thirty (30) feet in width for all operations, maintenance and transportation activities. For pipeline easements in Section 18, if pipelines are relocated, and for initial installation, pipeline easements shall in all cases be seventy-five (75)

feet in width during construction activities and reduced to fifty (50) feet in width for all operations, maintenance and transportation activities.

f. Uses Within the Pipeline Easements. Pipeline easements shall be for the use of pipelines for oil and gas production and operations; provided, however, the Oil Companies may install one or more pipelines within the same easement, and provided further, Surface Owner shall be entitled to cross such easements at approximately right angles and to install and maintain access to such easements for: i) utility lines, including those for water, gas, sewer, electric, telephone, cable, television and fiber optic; and ii) other purposes with the permission of the applicable Oil Companies, which permission shall not be unreasonably withheld; provided, however, any new underground facilities which travel along or within a pipeline easement identified herein shall be located at a distance horizontally of at least ten (10) feet from parallel existing oil and gas pipelines and flowlines, and such facilities shall have at least twenty-four (24) inches of vertical clearance between the new facility and an oil and gas pipeline or flowline provided for herein, and any overhead power lines shall be at least twenty (20) feet above the ground.

g. Surface Uses Over Pipeline Easements. In all cases, Surface Owner may install grasses (no trees or shrubs) and non-permanent soft surface trails that meander over and across pipeline easements, and it may also install paved surface trails, but only that cross pipeline easements at generally right angles. In cases where pipeline easements are located on the Property and adjacent to Weld County Road 3 or Weld County Road 5 and for the pipeline easement that runs north and south to the Oil and Gas Operations Area in the center of the SE/4 of Section 8 as depicted on Exhibit 2B for the Section 8 Property, Erie may request that Surface Owner install trees or bushes within the pipeline easement. In the event of such a request, Surface Owner shall prepare a landscape plan for review and the consent of KMGG, such consent not to be unreasonably withheld; provided however: i) installation of bushes shall be preferred to trees; and ii) trees and bushes shall not be located on the surface of the pipeline easement area within ten (10) feet of a pipeline. It shall not be unreasonable for KMGG to withhold consent to the installation of trees and bushes on a case by case basis for safety reasons or for the convenient installation and maintenance by KMGG of a pipeline or a portion of the pipeline or because of the type of bush or tree proposed by Surface Owner or the practical width of the pipeline easement given the installation of other pipelines, utilities or improvements within the same easement or proposed to be installed within the same easement, among other considerations. In all cases the Oil Companies shall not be liable for damages to the trails (both hard and soft surface), grasses, bushes or trees that are caused in whole or in part by their oil and gas operations.

h. Use of Pipeline Easements. The Oil Companies shall have the right to limit or restrict use of pipeline easements by Surface Owner and its other grantees for safety or security reasons. Surface Owner shall pay the Oil Companies all costs and expenses they incur to encase or lower pipelines and flowlines, as they determine to be reasonably necessary, to the extent that such pipelines and flowlines intersect and underlie any improvement permitted under this section. Under no circumstances shall Surface Owner prohibit the Oil Companies from the use of the flowlines and pipelines at any time. In addition, the Oil Companies shall have no liability to Surface Owner or any other parties for damage to improvements, landscaping, utilities or

facilities permitted to be installed by Surface Owner or such other parties within or adjacent to pipeline easements for damage caused by the oil and gas operations of the Oil Companies.

i. Minimum Ground Cover to be Maintained. Surface Owner shall maintain a minimum ground cover of 48 inches and not more than 72 inches over pipelines and flowlines in the conduct of its operations and its construction activities on the Property.

j. Road and Pipeline Construction/Coordination. Surface Owner will provide the Oil Companies with at least fourteen (14) days advance written notice before it begins to pave current and future streets and access routes, as applicable, in order to allow the Oil Companies the opportunity to lay new flowlines or pipelines that cross underneath the streets or access routes. If Surface Owner does not give the notice required herein, the Oil Companies may bore underneath the paved streets and access routes, such costs and expenses for the boring to be paid by Surface Owner.

k. Pipeline Depth Investigation. If Surface Owner's development plans anticipate that roadways will or may in the future cross over existing pipelines, Surface Owner will pothole or request that the Oil Companies pothole the existing and future pipelines to check the depth of such pipelines. Prior to Surface Owner's installation of a new roadway, the Oil Companies will lower, as required, the affected pipelines to sufficient depth for the road elevations. Surface Owner agrees to pay the Oil Companies the reasonable cost of inspecting and lowering the pipelines, as well as the reasonable cost of any sub-grade work required to achieve the road construction specifications.

4. Notice of Commencement of Surface Construction and Drilling Activities.

a. Surface Owner Notice. Surface Owner shall give advance notice to and meet at the site with representatives of the appropriate Oil Companies to locate existing pipelines and flowlines and to coordinate proposed surface construction activities with current and prospective oil and gas operations.

b. Oil Company Notice. The applicable Oil Company shall give notice to Surface Owner of proposed drilling activities on the Property in accordance with the rules and regulations of the COGCC, but in no event less than ten (10) days advance notice.

5. Surface Construction Activities.

a. Shut-In Production Payments. Surface Owner shall notify the applicable Oil Company at least twenty (20) days before Surface Owner intends to commence construction activities where it will utilize heavy equipment or other equipment that crosses flowlines or pipelines or that will occur adjacent to an Oil and Gas Operations Area. An Oil Company may, in its reasonable discretion, for safety purposes, shut in any pipeline or flowline over which Surface Owner's heavy earth moving equipment is to be run. Further, Surface Owner may request, or an Oil Company may elect, in its reasonable discretion, to shut in one or more of its wells during Surface Owner's construction activity on the surface of the Property. During the period of shut-in of any well, pipeline or flowline (either at the request of Surface Owner or at the discretion of the Oil Company as herein provided), Surface Owner shall pay the applicable

Oil Company an amount for each day of the shut-in equal to the average daily production of the affected well for the preceding six months calculated on the basis of the days that the well actually produced during the six month period.

Surface Owner shall also pay the Oil Company any costs to rework the well in order to place the well in production status after the shut-in and costs to replace pipelines and flowlines that are damaged by the surface construction activities of Surface Owner.

b. Electrical Equipment. Surface Owner shall pay the applicable Oil Company all costs that the Oil Company incurs to change electrical equipment for an Oil and Gas Operations Area where the Oil Company is required to make the change because of actual surface development of the Property.

6. Subdivision Plat and Local Regulations. Surface Owner shall identify the Temporary Easement Areas and the Oil and Gas Operations Areas and all present and future access routes and pipeline easements on its subdivision plats and in all applications for development that it files with a local jurisdiction. Plats shall include restrictions that no property line, permanent or temporary building, structure or other improvement, landscaping or sprinkler systems shall be located, constructed or installed within the Oil and Gas Operations Areas and pipeline easements, except as otherwise expressly permitted in sections 1.d. and 3.g. Except as expressly permitted under this Agreement, Surface Owner shall not locate temporary or permanent buildings, structures, improvements or landscaping or sprinkler systems within the Oil and Gas Operations Areas or upon or within the pipeline easements, and it shall not locate structures, improvements and equipment under the surface of the Oil and Gas Operations Areas, including but not limited to, sewer lines, gas pipelines or water lines.

7. Waiver of Surface Damage Payments. Surface Owner hereby waives all surface damage payments or other such payments for the use of the Property or portions thereof pursuant to any current or future COGCC or local regulation, state statute, common law or prior agreement for each and every well and related wellsite that is drilled and constructed within an Oil and Gas Operations Area and for all production facilities and for the pipeline easements and access routes as depicted on Exhibit 2A and Exhibit 2B (or relocated area) and for the use of the Temporary Easement Area as provided for herein. The Oil Companies may provide a copy of this Agreement to the COGCC or to any local jurisdiction, person or entity or any court of law as evidence of this waiver. The term "surface damages" shall be given the meaning commonly used in the oil and gas industry, but is not intended to be a waiver of damages caused by the negligence of the Oil Companies or their unreasonable use of the surface.

8. Waiver of Setback and Other Requirements. Surface Owner understands and acknowledges that the COGCC has rules and regulations that apply to the distance between a wellhead and public roads, production facilities, building units and surface property lines, among other things. Surface Owner hereby waives all setback requirements in COGCC Rule 603 (including the high density setback rules), or any successor rule or amendment to the COGCC setback rules, and to any other state or local setback requirements that are or become inconsistent with this Agreement or that would prohibit or interfere with the rights of the Oil Companies to explore for and produce the oil and gas in accordance with this Agreement. Surface Owner understands (and shall notify parties who purchase all or portions of the Property from Surface

Owner) that the Oil Companies may cite the waiver in this section 8 in order to obtain a location requirement exception or variance under COGCC rules or from a local jurisdiction; provided, any such request for an exception location or variance is consistent with the terms of this Agreement.

9. Payment of Relocation Costs. Surface Owner shall give advance written notice to the applicable Oil Company at least thirty (30) days prior to the time that Surface Owner requests that an Oil Company relocate an access road or pipeline pursuant to sections 2.b. or 3.d. The applicable Oil Company shall thereafter provide Surface Owner with an estimate of the costs for the relocation within thirty (30) days after receipt of the notice. Surface Owner shall pay the full amount of the estimate of relocation costs to the Oil Company within ten (10) days from the date it receives the estimate. Upon receipt of the estimate of costs by Surface Owner and the execution of a separate relocation agreement, the Oil Company will within a reasonable time commence the relocation of the applicable access road or pipeline, install the same in a good and workmanlike manner, and diligently pursue such relocation work to completion within a reasonable time. Upon completion of the relocation, the Oil Company shall give Surface Owner an accounting of the costs and expenses of the relocation. If the amount of such costs exceeds the amount of the estimate, Surface Owner shall pay the Oil Company the amount of the shortfall within ten (10) days from the receipt of the accounting. If the amount of such costs is less than the amount of the estimate, the Oil Company shall reimburse the difference to Surface Owner at the time it provides the accounting to Surface Owner.

10. Governmental Proceedings.

a. Surface Owner Will Not Object. Surface Owner agrees that: i) it will not object in any forum to the use by the Oil Companies of the surface of the Property consistent with this Agreement and the Development Agreement, to the extent not inconsistent with this Agreement, and hereby waives any such right to object or to request a hearing; ii) it will provide such other written approvals and waivers which are requested and consistent with this Agreement, including, but not limited to, all approvals and waivers to drill a well or to conduct oil and gas operations on the Property because of any law or regulation, including any local ordinance and regulations of the COGCC, and including, for example, waivers to state and local setback requirements and to any setback requirement from a surface property line or for an exception location; iii) it waives any rights it has to require or request a surface inspection for wells proposed to be drilled on the Property for the purpose of requesting that conditions be attached to a permit to drill a well and waives its right to request such conditions; iv) it consents to the location of multiple wells within an Oil and Gas Operations Area (as provided herein) that are greater or less than fifty feet apart so long as all such wells are located within the Oil and Gas Operations Area (as provided herein); and v) it waives its rights to object, request a hearing before the COGCC or that conditions be attached to a COGCC permit to drill, and to allege noncompliance with COGCC rules or applicable statutes, or to allege potential adverse impacts to public health, safety, and welfare, including the environment and wildlife resources, that are within the jurisdiction of the COGCC with respect to COGCC Applications for Permit to Drill ("Form 2") and COGCC Oil and Gas Location Assessments ("Form 2A").

b. Oil Companies Will Not Object. Except as provided in section 28.c. with respect to the Anadarko Entities, the Oil Companies agree that they will not object in any forum to a

request by Surface Owner to zone, rezone, plat or replat all or any portion of the Property to the extent such request is consistent with this Agreement and the Development Agreement, to the extent not inconsistent with this Agreement.

11. Notice to Home Builders and Homeowners. Surface Owner shall furnish all persons or entities that have a contract to purchase or that purchase all or any portion of the Property from Surface Owner with an exhibit that shows the locations of all Oil and Gas Operations Areas, existing and future pipeline easements and existing and proposed access routes. In addition, Surface Owner shall provide written notice to all such purchasers that includes as follows:

i. such buyers are not purchasing and will not own any interest in the oil and gas mineral estate;

ii. there may be ongoing oil and gas operations and production on the surface of the Property within the Oil and Gas Operations Areas, pipeline easements and access routes;

iii. additional oil and gas wells are likely to be drilled and oil and gas operations and production will likely take place on the Property, including the construction of oil and gas facilities, pipelines and flowlines, which will affect the surface of the Property within the Oil and Gas Operations Areas, pipeline easement(s) and access road(s);

iv. heavy equipment will be used by the oil and gas interest owners from time to time for oil and gas drilling and production operations, and such operations may be conducted on a 24 hour basis;

v. future purchasers of all or a portion of the Property, as successors in interest, will be bound by the covenants and provisions in this Agreement and subject to the waivers and covenants (i) included in sections 1.d., 2.a., 3.c., 7, 8, 10 and 21, among others; (ii) prohibiting the location of any building, structure, or other improvement by the purchaser within the Oil and Gas Operations Areas and pipeline easement areas; (iii) waiving objections to the drilling of wells, the construction of facilities, and the conduct of oil and gas operations on the Property consistent with this Agreement; and iii) waiving objections to the setback requirements under the rules of the COGCC or any local jurisdiction.

12. Impact Mitigation.

a. Oil Company Mitigation. The Oil Companies agree that they shall install and maintain and repair at their sole cost and expense such fences, gates and locks around the wells and production facilities as are required by the COGCC or Erie or Weld County as a condition for a special use permit to drill wells. To the extent required by law or regulation, the Oil Companies shall bear the costs of impact mitigation measures, including environmental or hazardous materials cleanup, remediation or mitigation for their individual operations on the Property.

b. Surface Owner Mitigation. Except as provided in section 12.a., Surface Owner shall bear all costs and expenses to install such noise and visual impact mitigation measures it desires or Erie or Weld County or other applicable local jurisdiction requires at or around the Oil

shall be construed as if drafted jointly by the parties and no presumption or burden of proof shall arise favoring or disfavoring any party by virtue of authorship of any of the provisions of this Agreement. Any reference to any federal, state, local or foreign statute or law shall be deemed also to refer to all rules and regulations promulgated thereunder, unless the context requires otherwise. The word "including" shall mean including, without limitation.

23. Successors and Assigns. This Agreement and all of the covenants in it shall be binding upon the personal representatives, heirs, successors and assigns of all of the parties, and the benefits of this Agreement shall inure to their personal representatives, heirs, successors and assigns. This Agreement and all of the covenants in it shall be covenants running with the land.

24. Recording. The Oil Companies shall record this Agreement with the Clerk and Recorder of Weld County promptly after it is executed by all of the parties and provide evidence to the other parties of the recording.

25. Governing Law. The validity, interpretation and performance of this Agreement shall be governed and construed in accordance with the laws of the State of Colorado without reference to its conflicts of laws provisions.

26. Severability. If any part of this Agreement is found to be in conflict with applicable laws, such part shall be inoperative, null and void insofar as it conflicts with such laws; however, the remainder of this Agreement shall be in full force and effect. In the event that any part of this Agreement would otherwise be unenforceable or in conflict with applicable laws due to the term or period for which such part is in effect, the term or period for which such part of this Agreement shall be in effect shall be limited to the longest period allowable which does not cause such part to be unenforceable or in conflict with applicable laws.

27. Incorporation by Reference. Exhibits 1A, 1B, 2A, 2B, 3, 4 and 5 are incorporated into this Agreement by reference.

28. Entire Agreement and Conflicts in Agreements.

a. Entire Agreement. With respect to the matters included in them, this Agreement, the Development Agreement and the Letter Agreement set forth the entire understanding among the parties or the particular parties to the specific agreement and supersede any previous communications, representations or agreements, whether oral or written. No change of any of the terms or conditions herein shall be valid or binding on any party unless in writing and signed by an authorized representative of each party.

b. Conflicts Between Particular Agreements. In the event of a conflict between this Agreement and the Development Agreement for a matter specifically covered in this Agreement, this Agreement shall control. In the event of a conflict between this Agreement and the Letter Agreement for a matter specifically covered in the Letter Agreement, the Letter Agreement shall control.

c. Anadarko Entities Agreement Conditional. The agreement herein of the Anadarko Entities is conditioned upon the execution by Surface Owner of: i) the Letter

and Gas Operations Areas which are in excess of or in addition to those measures which are required by COGCC regulations for areas which are not high density and which are required at the time Surface Owner applies for surface development approvals; provided, however, the operator of the well within the particular Oil and Gas Operations Area shall have reasonable discretion to veto or protest the types and locations of impact mitigation measures in order to allow for safe oil and gas operations.

13. Limited Surface Use By Oil Companies. Except for the Oil and Gas Operations Areas and the access roads and easements associated with flowlines, gathering lines and pipelines as provided for in this Agreement, and the use of the Temporary Easement Areas as provided herein, the Oil Companies shall not occupy the surface of the Property except in the event of an emergency or for reasonable incidental, temporary and non-damaging activities, for which the particular Oil Company shall be strictly and solely responsible for any damages that may occur.

14. Compliance with Kerr-McGee's General Guidelines. Surface Owner acknowledges that it has received a copy of a document from Kerr-McGee titled "General Guidelines for Design and Construction Activities On or Near Kerr-McGee Gathering LLC and Kerr-McGee Rocky Mountain Corporation Pipelines and Related Facilities" (Revision 1/2010) with which Surface Owner agrees to comply and which is attached as Exhibit 5.

15. Individual Liability of Oil Companies. Nothing in this Agreement is intended to create a cause of action by any Oil Company against any other Oil Company or to enlarge or diminish any right or interest created by any agreement or lease or assignment of lease between or among the Oil Companies. The liability of the Oil Companies to perform any obligation or to comply with any agreement hereunder or to comply with any state or local rule or regulation is individual and several and not joint or collective. No Oil Company shall be liable or responsible for the acts, omissions, performance, obligations or duties of the other Oil Companies under this Agreement. Surface Owner shall look solely to the applicable Oil Company for the performance by such Oil Company of its obligations under this Agreement and compliance with applicable laws and regulations with respect to its respective oil and gas operations on the Property. The agreements herein of a particular Oil Company apply only to the extent of the oil and gas interests in the Property that are now owned or that may be owned in the future by that Oil Company. This Agreement does not create a joint venture or partnership between or among any of the Oil Companies or the Anadarko Entities. The Anadarko Entities shall in no event be liable for the acts or omissions of their lessees, assignees of such lessees or farmoutees or the contractors and subcontractors of any of them.

16. No Waiver of Rights. The Oil Companies do not waive the rights they have pursuant to each of their respective oil and gas interests to explore for, drill and produce the oil and gas for the Property or for ingress and egress to any Oil and Gas Operations Area, except as specifically provided in this Agreement.

17. Conflict in Agreements. In the event of a conflict between this Agreement and the Development Agreement, this Agreement shall control; provided, however, the terms of the Development Agreement shall continue to apply to the extent that they are not inconsistent with this Agreement.

18. Notice of Hearings. Surface Owner shall provide the Oil Companies with written notice not less than thirty (30) days before each hearing for approval of a plat application or other land use application for the Property that is to be held before Erie or Weld County.

19 Notices. Any notice or other communication required or permitted under this Agreement shall be given in writing by any of: i) personal delivery; ii) expedited delivery service with proof of delivery; iii) United States mail, postage prepaid, and registered or certified mail with return receipt requested; or iv) prepaid telecopy or fax, the receipt of which shall be acknowledged, addressed as follows:

Surface Owner:	Tallgrass Investors, LLC 2500 Arapahoe Avenue, Suite 220 Boulder, Colorado 80302 Attention: Jon Lee Fax: (303) 442-1241
Anadarko Entities Kerr-McGee and KMGG:	Anadarko Petroleum Corporation 1099 18th Street, Suite 1800 Denver, Colorado 80202
Encana:	Encana Oil & Gas (USA) Inc. 370 17th Street, Suite 1700 Denver, Colorado 80202 Attn: DJ Land Team Lead

Any party may, by written notice as provided in this section, change the address of the individual to whom delivery of notices shall be made thereafter.

20. Acknowledgment of Title to Oil and Gas. Surface Owner specifically acknowledges the title of Anadarko E&P and Anadarko Land to the oil and gas reserved for the Property and relinquishes all rights and claims thereto, and it also acknowledges the oil and gas leasehold rights that Kerr-McGee and Encana own for the Property and relinquishes all rights and claims thereto.

21. Compliance with Common Law and Statutory and Regulatory Requirements. Surface Owner expressly acknowledges that this Agreement satisfies the obligations and requirements of the Oil Companies pursuant to COGCC rules and regulations and Colorado statutes to consult in good faith with Surface Owner regarding existing and proposed oil and gas operations on the Property, including pursuant to COGCC Rules 305 and 306, as amended. Surface Owner further expressly acknowledges that this Agreement shall be deemed to be specifically applicable to, and to fully satisfy, the obligations of the Oil Companies to accommodate the use of the surface of the Property by Surface Owner, existing and future, and Surface Owner waives any statutory and common law claims to the contrary, including, but not limited to, any claims pursuant to C.R.S. 34-60-127.

22. Construction. The parties have participated jointly in the negotiating and drafting of this Agreement. In the event ambiguity or question of intent or interpretation arises, this Agreement

Agreement; and ii) a separate letter agreement among the Anadarko Entities, Noble Energy, Inc. and Surface Owner for property included in the Bridgewater development described as the N/2 of Section 17, Township 1 North, Range 68 West.

29. Counterpart Executions. This Agreement may be executed in counterparts, each of which shall be deemed an original, and all of which together shall constitute one and the same instrument.

IN WITNESS WHEREOF, the undersigned parties have caused this Agreement to be executed by duly authorized representatives on the dates set forth in the acknowledgements, but to be effective on the date first above written.

ANADARKO E&P COMPANY LP

By: _____
Name: David Bell
Its: Agent and Attorney-In-Fact

ENCANA OIL & GAS (USA) INC.

By: _____
Name: _____
Its: _____

ANADARKO LAND CORP.

By: _____
Name: David Bell
Its: Agent and Attorney-In-Fact

TALLGRASS INVESTORS, LLC

By: _____
Name: _____
Its: _____

KERR-McGEE OIL & GAS ONSHORE LP

By: _____
Name: David Bell
Its: Agent and Attorney-In-Fact

Kerr-McGee Gathering LLC signs this Agreement as the entity which gathers and may in the future gather gas from wells drilled on the Property or on lands near the Property and in no other capacity. KMGG is not otherwise bound by the obligations in this Agreement, but shall have the right to enforce the provisions in section 3.

KERR-McGEE GATHERING LLC

By: _____
Name: Ronald H. Olsen
Title: Agent + Attorney-in-Fact

Agreement; and ii) a separate letter agreement among the Anadarko Entities, Noble Energy, Inc. and Surface Owner for property included in the Bridgewater development described as the N/2 of Section 17, Township 1 North, Range 68 West.

29. Counterpart Executions. This Agreement may be executed in counterparts, each of which shall be deemed an original, and all of which together shall constitute one and the same instrument.

IN WITNESS WHEREOF, the undersigned parties have caused this Agreement to be executed by duly authorized representatives on the dates set forth in the acknowledgements, but to be effective on the date first above written.

ANADARKO E&P COMPANY LP

By: _____
Name: _____
Its: _____

ENCANA OIL & GAS (USA) INC.

By: _____
Name: Ricardo D. Gallegos
Its: Attorney In Fact

ANADARKO LAND CORP.

By: _____
Name: _____
Its: _____

TALLGRASS INVESTORS, LLC

By: _____
Name: _____
Its: _____

KERR-McGEE OIL & GAS ONSHORE LP

By: _____
Name: _____
Its: _____

Kerr-McGee Gathering LLC signs this Agreement as the entity which gathers and may in the future gather gas from wells drilled on the Property or on lands near the Property and in no other capacity. KMGG is not otherwise bound by the obligations in this Agreement, but shall have the right to enforce the provisions in section 3.

KERR-McGEE GATHERING LLC

By: _____
Name: _____
Title: _____

Agreement; and ii) a separate letter agreement among the Anadarko Entities, Noble Energy, Inc. and Surface Owner for property included in the Bridgewater development described as the N/2 of Section 17, Township 1 North, Range 68 West.

29. Counterpart Executions. This Agreement may be executed in counterparts, each of which shall be deemed an original, and all of which together shall constitute one and the same instrument.

IN WITNESS WHEREOF, the undersigned parties have caused this Agreement to be executed by duly authorized representatives on the dates set forth in the acknowledgements, but to be effective on the date first above written.

ANADARKO E&P COMPANY LP

By: _____
Name: _____
Its: _____

ENCANA OIL & GAS (USA) INC.

By: _____
Name: _____
Its: _____

ANADARKO LAND CORP.

By: _____
Name: _____
Its: _____

TALLGRASS INVESTORS, LLC

By: _____
Name: Jon RLEE
Its: AUTHORIZED REPRESENTATIVE

KERR-McGEE OIL & GAS ONSHORE LP

By: _____
Name: _____
Its: _____

Kerr-McGee Gathering LLC signs this Agreement as the entity which gathers and may in the future gather gas from wells drilled on the Property or on lands near the Property and in no other capacity. KMGG is not otherwise bound by the obligations in this Agreement, but shall have the right to enforce the provisions in section 3.

KERR-McGEE GATHERING LLC

By: _____
Name: _____
Title: _____

3799568 10/18/2011 12:26P Weld County, CO
18 of 46 R 236.00 D 0.00 Steve Moreno Clerk & Recorder

ACKNOWLEDGMENTS

STATE OF Colorado)
) ss.
COUNTY OF Adams)

The foregoing instrument was acknowledged before me this 10th day of October, 2011, by David Bell, as Agent and Attorney-In-Fact for ANADARKO E&P COMPANY LP.

My Commission expires: 9/27/2015:

Witness my hand and official seal.

Notary Public

M. HENCMANN NOTARY PUBLIC STATE OF COLORADO
My Commission Expires 9-27-2015

STATE OF Colorado)
) ss.
COUNTY OF Adams)

The foregoing instrument was acknowledged before me this 10th day of October, 2011, by David Bell, as Agent and Attorney-In-Fact for ANADARKO LAND CORP.

My Commission expires: 9/27/2015:

Witness my hand and official seal.

Notary Public

M. HENCMANN NOTARY PUBLIC STATE OF COLORADO
My Commission Expires 9-27-2015

STATE OF Colorado)
) ss.
COUNTY OF Adams)

The foregoing instrument was acknowledged before me this 10th day of October, 2011, by David Bell, as Agent and Attorney-In-Fact for KERR-McGEE OIL & GAS ONSHORE LP.

My Commission expires: 9/27/2015:

Witness my hand and official seal.

Notary Public

M. HENCMANN NOTARY PUBLIC STATE OF COLORADO
My Commission Expires 9-27-2015

3799568 10/18/2011 12:26P Weld County, CO
19 of 46 R 236.00 D 0.00 Steve Moreno Clerk & Recorder

STATE OF Colorado)
Denver) ss.
COUNTY OF ~~Adams~~)

The foregoing instrument was acknowledged before me this 11th day of October, 2011, by Ronald H. Olsen, as Agent and Attorney-In-Fact for KERR-McGEE GATHERING LLC.

My Commission expires: 9/27/2015:

Witness my hand and official seal.

Notary Public

M. HENGMANN NOTARY PUBLIC STATE OF COLORADO
My Commission Expires 9-27-2015

STATE OF COLORADO)
) ss.
City and County of Denver)

The foregoing instrument was acknowledged before me this _____ day of _____, 2011, by _____, as _____ for ENCANA OIL & GAS (USA) INC.

My Commission expires:_____:

Witness my hand and official seal.

_____
Notary Public

STATE OF COLORADO)
) ss.
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____, 2011, by _____, as _____ for TALLGRASS INVESTORS, LLC

My Commission expires:_____:

Witness my hand and official seal.

_____
Notary Public

3799568 10/18/2011 12:26P Weld County, CO
20 of 46 R 236.00 D 0.00 Steve Moreno Clerk & Recorder

STATE OF _____)
) ss.
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____, 2011, by _____, as _____ for KERR-McGEE GATHERING LLC.

My Commission expires:_____:

Witness my hand and official seal.

_____
Notary Public

STATE OF COLORADO)
) ss.
City and County of Denver)

The foregoing instrument was acknowledged before me this 28th day of September 2011, by Rick Gallegar, as Attorney-in-Fact for ENCANA OIL & GAS (USA) INC.

My Commission expires: 11/30/2011:

Witness my hand and official seal.

Notary Public

EMILY CONRAD NOTARY PUBLIC STATE OF COLORADO
My Commission Expires 11/30/2011

STATE OF COLORADO)
) ss.
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____, 2011, by _____, as _____ for TALLGRASS INVESTORS, LLC

My Commission expires:_____:

Witness my hand and official seal.

_____
Notary Public

3799568 10/18/2011 12:26P Weld County, CO
21 of 46 R 236.00 D 0.00 Steve Moreno Clerk & Recorder

STATE OF _____)
) ss.
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____, 2011, by _____, as _____ for KERR-McGEE GATHERING LLC.

My Commission expires:_____:

Witness my hand and official seal.

_____
Notary Public

STATE OF COLORADO)
) ss.
City and County of Denver)

The foregoing instrument was acknowledged before me this _____ day of _____, 2011, by _____, as _____ for ENCANA OIL & GAS (USA) INC.

My Commission expires:_____:

Witness my hand and official seal.

_____
Notary Public

STATE OF COLORADO)
) ss.
COUNTY OF DENVER)

The foregoing instrument was acknowledged before me this 11th day of October, 2011, by Don R. Lee, as Authorized Representative for TALLGRASS INVESTORS, LLC

My Commission expires: 4/27/2013:

LORRI L. SIMPSON NOTARY PUBLIC STATE OF COLORADO My Commission Expires 4/27/13

Witness my hand and official seal.

Lorri L. Simpson
Notary Public

3799568 10/18/2011 12:26P Weld County, CO
22 of 46 R 236.00 D 0.00 Steve Moreno Clerk & Recorder

Exhibit 1A

to

Surface Use Agreement effective September 27, 2011 by and among Anadarko Land Corp., Anadarko E&P Company LP, Kerr-McGee Oil & Gas Onshore LP, Kerr-McGee Gathering LLC (for the limited purposes described herein), Encana Oil & Gas (USA) Inc. and Tallgrass Investors, LLC

Legal Description of the Section 18 Property

Township 1 North, Range 68 West
Section 18: metes and bounds description
Weld County, Colorado

See attached legal description consisting of two (2) pages.

3799568 10/18/2011 12:26P Weld County, CO
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Exhibit 1B
to
Surface Use Agreement effective September 27, 2011
by and among Anadarko Land Corp., Anadarko E&P Company LP, Kerr-McGee Oil & Gas Onshore LP, Kerr-McGee Gathering LLC (for the limited purposes described herein), Encana Oil & Gas (USA) Inc. and Tallgrass Investors, LLC

Legal Description of the Section 8 Property

Township 1 North, Range 68 West
Section 8: metes and bounds description
Weld County, Colorado

See attached legal description consisting of two (2) pages.

3799568 10/18/2011 12:26P Weld County, CO
23 of 46 R 236.00 D 0.00 Steve Moreno Clerk & Recorder

Section 18 Property

A parcel of land situate in the E1/2 of Section 18, Township 1 North, Range 68 West of th 6th P.M., Weld County, more particularly described as follows:

PARCEL D

Commencing at the Northeast corner of Section 18, Township 1 North, Range 68 West, 6th P.M., from whence the East 1/4 corner of said section lies S00°02'28" E, 2678.62 feet;
Thence N89°14'48" W, 30.07 feet to the point of beginning;
Thence S00°02'28" E, 1897.89 feet parallel with and 30.00 feet distant West of the East line of the NE1/4 of Section 18 to a point on the North line of the Erie Cemetery, partially described in a deed recorded on May 23, 1968, as Reception No. 1516751;
Thence N89°59'20" W, 640.42 feet to the Northwest corner of said cemetery;
Thence S00°03'40" W, 404.65 feet to the North line of a parcel recorded in Book 30, Page 483;
Thence N89°34'58" W, 163.67 feet to the Northwest corner of said parcel;
Thence S00°04'57" E, 417.42 feet to the Southwest corner of said parcel;
Thence S89°34'58" E, 804.84 feet to a point 30.00 feet westerly of the East line of the SE1/4 of Section 18;
Thence S00°25'10" E, 1450.65 feet parallel with and 30.00 feet distant westerly of the East line of said SE1/4 to a point on the North line of a parcel recorded as Reception No 1516751;

Thence along boundary of said parcel the following three courses:
1) S89°40'50" W, 658.56 feet,
2) S00°19'10" E, 253.00 feet,
3) N89°40'50" E, 659.00 feet to a point 30.00 feet westerly of the East line of the SE1, of Section 18;

Thence S00°25'10" E, 825.08 feet to a point 30.00 feet northerly of the South line of sai SE1/4 of Section 18, said point also being the northerly right-of-way line of Weld County Road 8;
Thence N89°31'17" W, 258.53 feet, along said northerly right of way, parallel with and 30.00 feet North of the South line of said SE1/4;
Thence N86°54'04" W, 1098.49 feet along the northerly line of Weld County Road 8, as described in Book 15551, Pages 39-43, Reception Nos. 2495437-41 to a point on the easterl line of property described in Book 754 at Reception No. 1676471;

Thence along said property the following three courses:
1) N00°29'16" E, 49.80 feet;
2) 453.09 feet along the arc of a tangent curve to the left, said arc subtended by a radius of 440.00 feet, a central angle of 59°00'00", and a chord bearing N29°00'44" W 433.33 feet;
3) N58°30'44" W, 204.67 feet to a point 50.00 feet distant southeasterly, measured at right angles, from the centerline of the main track of the Boulder branch of the Unic

(continued)

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Pacific Railroad Company as presently constructed and operated, said right of way conveyed to the Union Pacific Railroad by deed recorded in Book 359 at Page 418;
Thence northerly along a line drawn parallel and/or radially with said centerline of ma. track the following nine courses:

1) 629.21 feet along the arc of a non-tangent curve to the left, said arc subtended by radius of 1007.50 feet, a central angle of 35°46'57", and a chord bearing N07°31'37 E, 619.03 feet;
2) Thence N10°21'52" W, 694.70 feet;
3) 894.20 feet along the arc of a tangent curve to the right, said arc subtended by a radius of 1287.50 feet, a central angle of 39°47'36", and a chord bearing N09°31'57 E, 876.34 feet;
4) N29°25'45" E, 224.87 feet;
5) 463.85 feet along the arc of a tangent curve to the left, said arc subtended by a radius of 1673.50 feet, a central angle of 15°52'51", and a chord bearing N21°29'19 E, 462.36 feet;
6) N13°32'54" E, 421.72 feet;
7) 966.21 feet along the arc of a tangent curve to the left, said arc subtended by a radius of 2957.50 feet, a central angle of 18°43'06", and a chord bearing N04°11'21 E, 961.91 feet;
8) N05°10'12" W, 351.67 feet;
9) 165.08 feet along the arc of a tangent curve to the right, said arc subtended by a radius of 1575.00 feet, a central angle of 06°00'20", and a chord bearing N02°10'02 W, 165.01 feet to a point on the North line of the NE1/4 of Section 18;

Thence along said North line S89°14'48" E, 1206.77 feet to the point of beginning,
EXCEPTING THEREFROM a "road right of way 8 feet in width leading to said cemetery from Erie", so described in Book 30 at Page 483.

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Section 8 Property

Two parcels of land situate in the S21/4 of Section 8, Township 1 North, Range 68 West o the 6th P.M., Weld County, more particularly described as follows:

PARCEL B

Commencing at the Southeast corner of Section 8, Township 1 North, Range 68 West, 6th P.M., from whence the East 1/4 corner of said section lies N00°49'09" E, 2674.68 feet; Thence N45°04'48" W, 41.78 feet to the point of beginning, 30.00 feet North of the South line of said section;
Thence S89°01'14" W, 2618.83 feet parallel with and 30.00 feet North of the South line o said section to a point on the North-South centerline of Section 8;
Thence N00°01'31" E, 1579.23 feet along said North-South centerline to a point on the South right of way line of the Union Pacific Railroad, said right-of-way conveyed to the Union Pacific Railroad by a deed recorded June 13, 1912, in Book 359 at Page 418, said right-of-way line being 50.00 feet distant southerly as measured at right angles or radially from the existing main track centerline;
Thence along said right of way the following three courses:

1) N42°43'40" E, 467.34 feet,
2) 1735.43 feet along the arc of a tangent curve to the right, said arc subtended by a radius of 1858.50 feet, a central angle of 53°30'06", and a chord bearing N69°28'43" E, 1673.07 feet,
3) S83°46'14" E, 772.36 feet to a point 30.00 feet West of the East line of the S1/2 of the section;

Thence S00°49'09" W, 2380.71 feet parallel with and 30.00 feet West of the East line of the S1/2 to the point of beginning.

(continued)

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PARCEL B-1

Commencing at the East 1/4 corner of Section 8, Township 1 North, Range 68 West, 6th P.M. from whence the Southeast corner of said section lies S00°49'09" W, 2674.68 feet;
Thence along the East-West centerline S89°35'35" W, 30.00 feet to the point of beginning;
Thence S00°49'09" W, 163.81 feet parallel with and 30.00 feet West of the East line of th S1/2 of Section 8 to a point on the northerly right-of-way line of the Union Pacific Railroad, said right of way conveyed to the Union Pacific Railroad by a deed recorded Jur 13, 1912, in Book 359 at Page 418, said right-of-way line being 50.00 feet distant northerly as measured at right angles or radially from the existing main track centerline;
Thence following said northerly right of way the following three courses:

1) N83°46'14" W, 762.89 feet,
2) 1828.81 feet along the arc of a tangent curve to the left, said arc subtended by a radius of 1958.50 feet, a central angle of 53°30'06", and a chord bearing S69°28'43" W, 1763.09 feet;
3) S42°43'40" W, 358.98 feet to a point on the North-South centerline of Section 8;

Thence N00°01'31" E, 943.91 feet along said North-South centerline to a point on the East-West centerline of said Section 8;
Thence N89°35'35" E, 2655.15 feet along the East-West centerline to the point of beginning.

(continued)

3799568 10/18/2011 12:26P Weld County, CO
28 of 46 R 236.00 D 0.00 Steve Moreno Clerk & Recorder

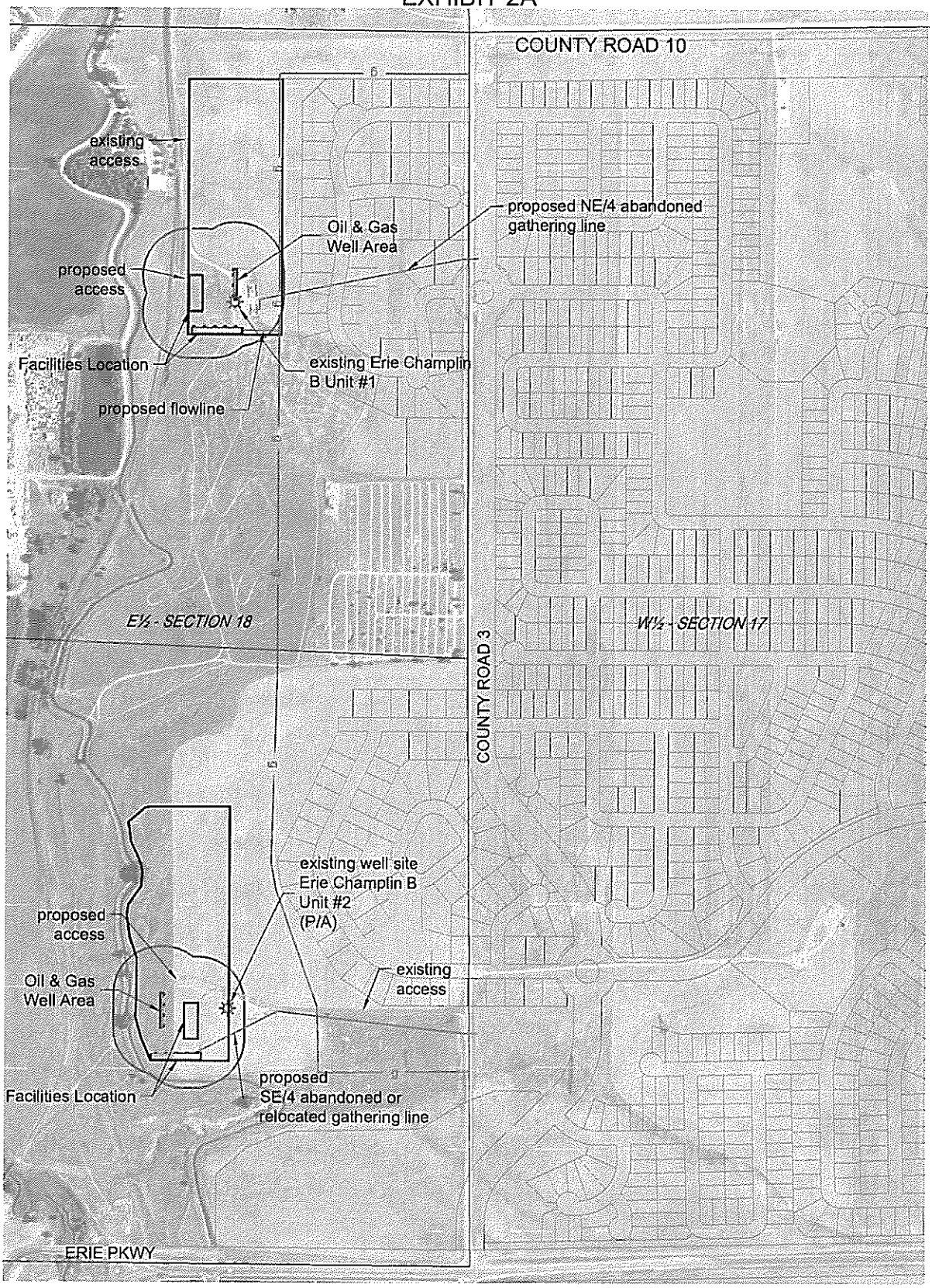
Exhibit 2A

to

Surface Use Agreement effective September 27, 2011 by and among Anadarko Land Corp., Anadarko E&P Company LP, Kerr-McGee Oil & Gas Onshore LP, Kerr-McGee Gathering LLC (for the limited purposes described herein), Encana Oil & Gas (USA) Inc. and Tallgrass Investors, LLC

See attached Plats consisting of three (3) pages for the Section 18 Property.

EXHIBIT 2A



PROPOSED ACCESS

FUTURE PIPELINE EASEMENT (75' TEMPORARY & 50' PERMANENT)

TEMPORARY EASEMENT AREA

OIL & GAS OPERATIONS AREA

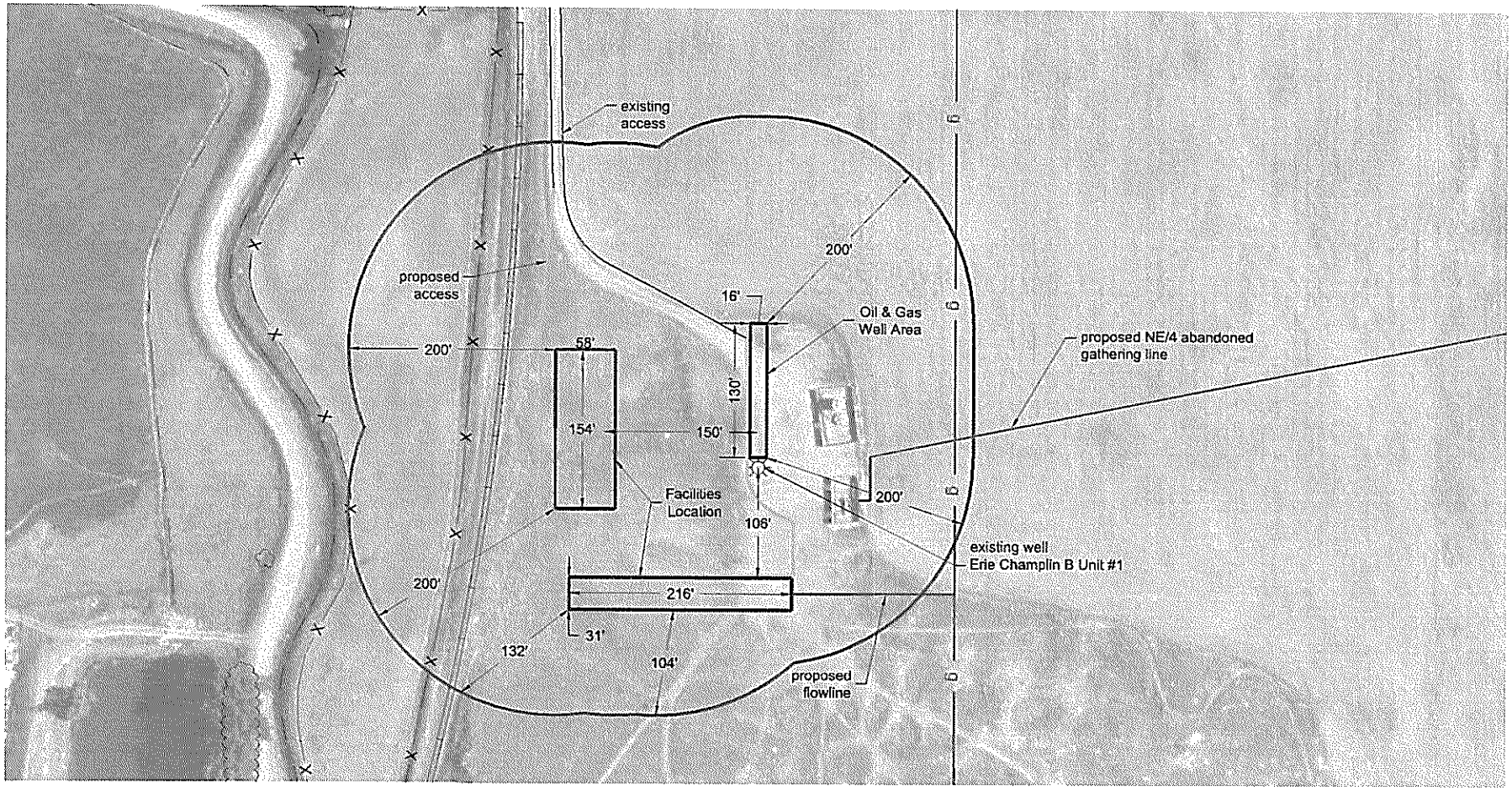
encana

TOWNSHIP 1 NORTH, RANGE 68 WEST
A PORTION OF SECTIONS 17 & 18
WELD COUNTY, COLORADO

SCALE: 1" = 400' SEPTEMBER 26, 2011

EXHIBIT 2A.1

3799568 10/18/2011 12:26P Weld County, CO
30 of 46 R 236.00 D 0.00 Steve Moreno Clerk & Recorder



OIL & GAS OPERATIONS AREA

PROPOSED ACCESS

g — FUTURE PIPELINE EASEMENT
(75' TEMPORARY & 50' PERMANENT)

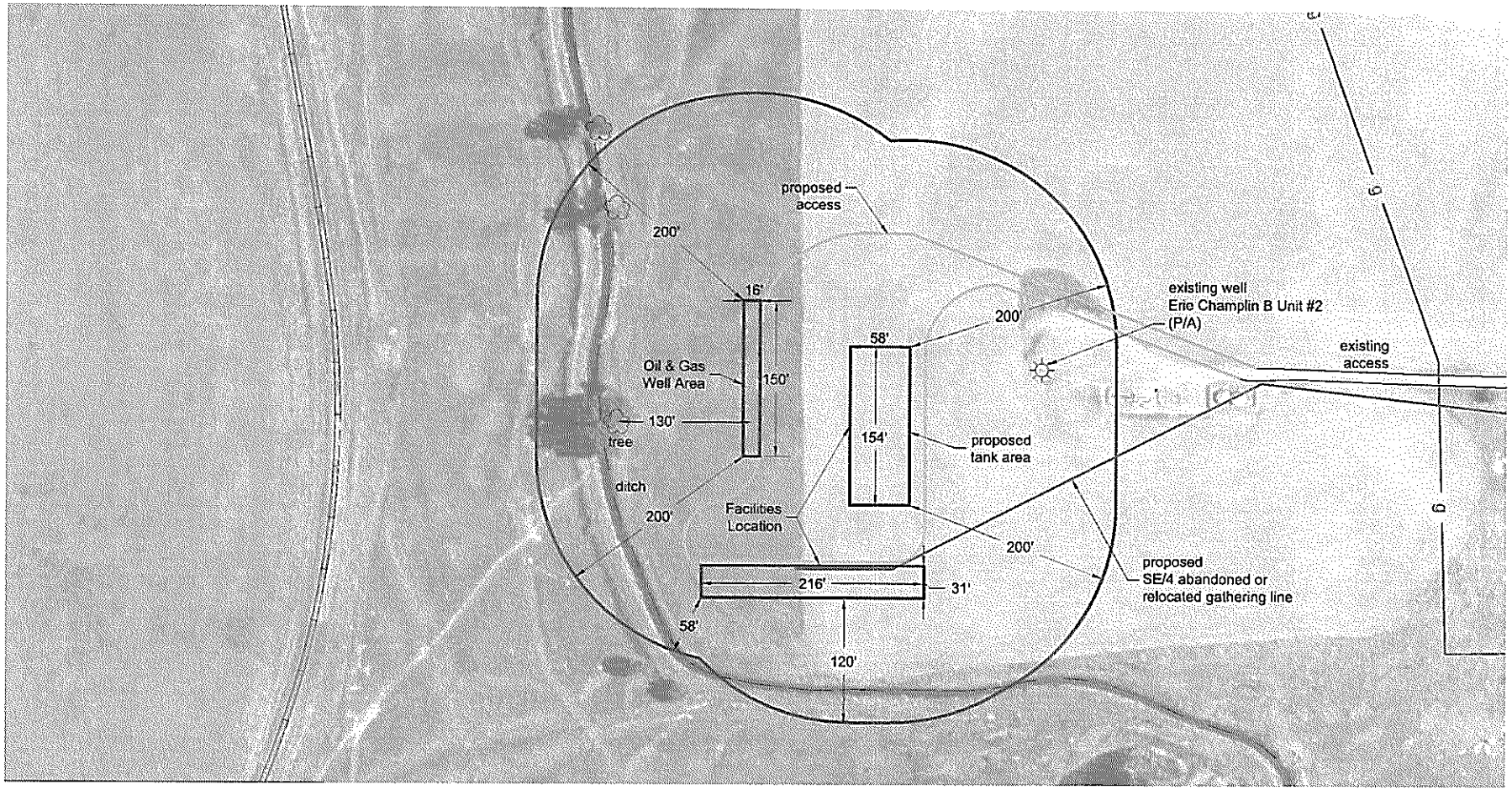
encana.

TOWNSHIP 1 NORTH, RANGE 68 WEST
SECTION 18: NE¼
WELD COUNTY, COLORADO

SCALE: 1" = 150' SEPTEMBER 26, 2011

EXHIBIT 2A.2

3799568 10/18/2011 12:26P Weld County, CO
31 of 46 R 236.00 D 0.00 Steve Moreno Clerk & Recorder



OIL & GAS OPERATIONS AREA

PROPOSED ACCESS

g — FUTURE PIPELINE EASEMENT
(75' TEMPORARY & 50' PERMANENT)

encana

TOWNSHIP 1 NORTH, RANGE 68 WEST
SECTION 18: SE¼
WELD COUNTY, COLORADO

SCALE: 1" = 150' SEPTEMBER 26, 2011

3799568 10/18/2011 12:26P Weld County, CO
32 of 46 R 236.00 D 0.00 Steve Moreno Clerk & Recorder

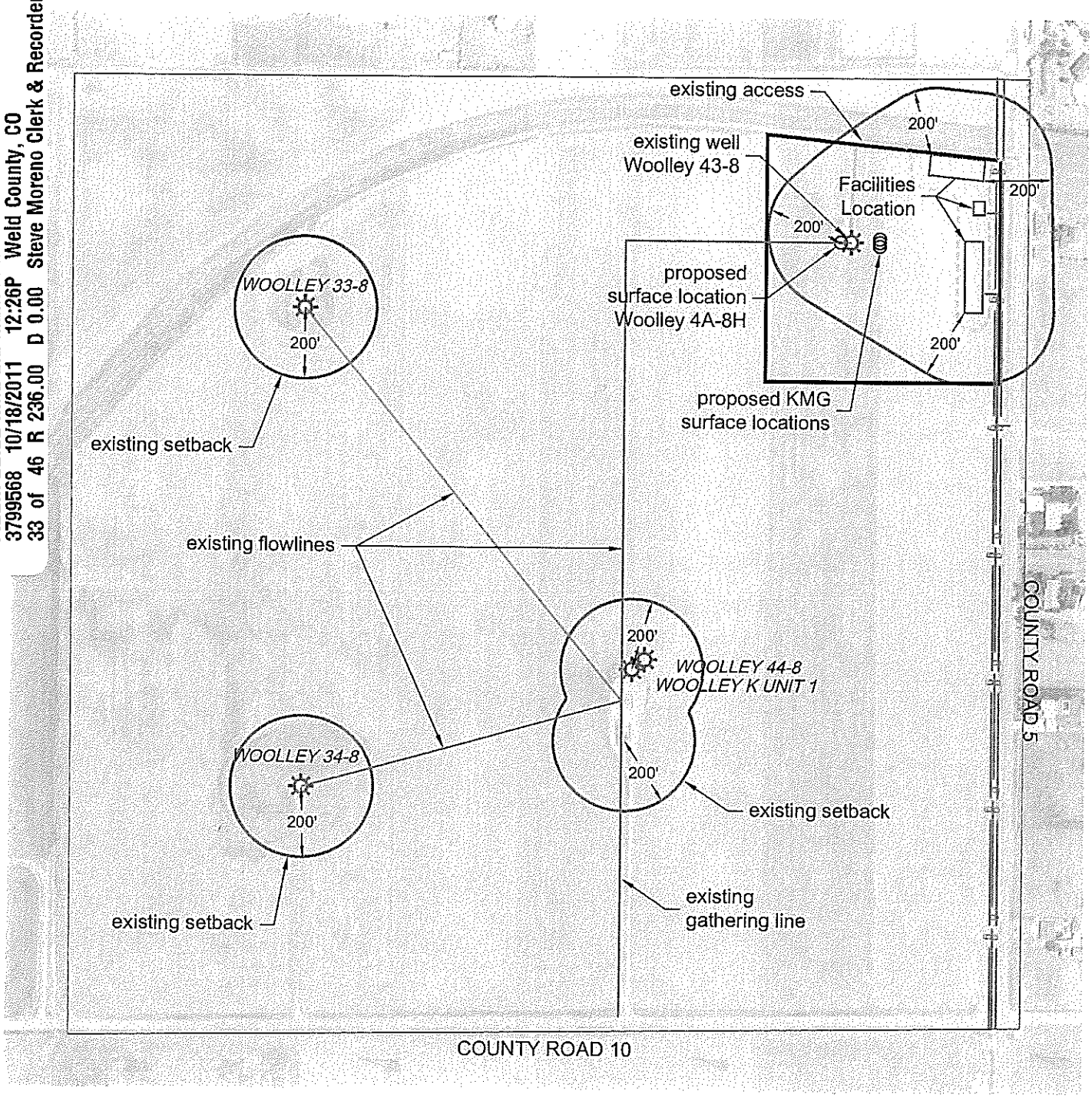
Exhibit 2B

to

Surface Use Agreement effective September 27, 2011 by and among Anadarko Land Corp., Anadarko E&P Company LP, Kerr-McGee Oil & Gas Onshore LP, Kerr-McGee Gathering LLC (for the limited purposes described herein), Encana Oil & Gas (USA) Inc. and Tallgrass Investors, LLC

See attached Plats consisting of two (2) pages for the Section 8 Property.

EXHIBIT 2B



TEMPORARY EASEMENT AREA

OIL & GAS OPERATIONS AREA

PROPOSED FUTURE PIPELINE EASEMENT
(50' TEMPORARY & 30' PERMANENT)

PROPOSED ACCESS

encana

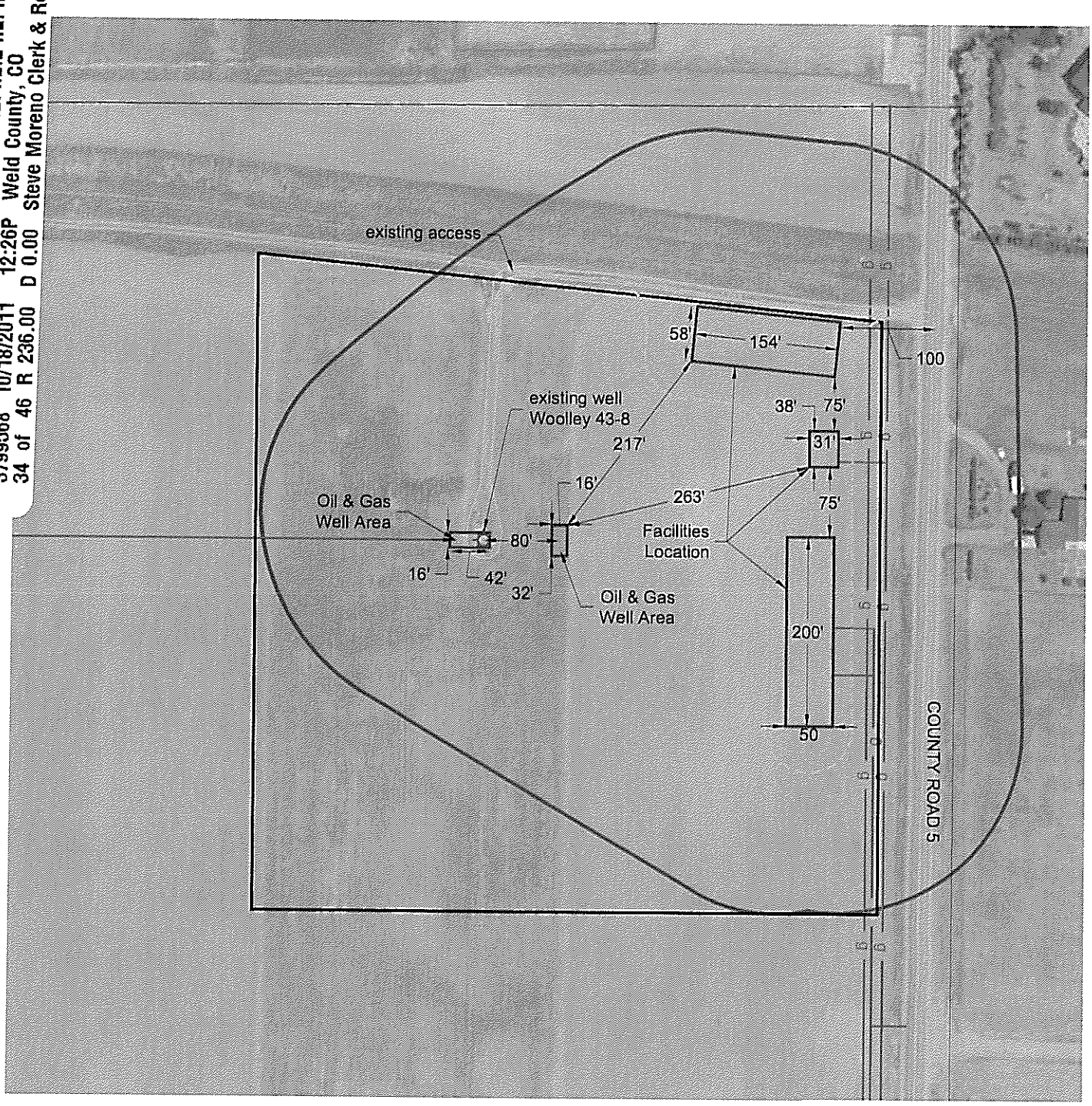
TOWNSHIP 1 NORTH, RANGE 68 WEST
SECTION 8: SE¼

WELD COUNTY, COLORADO

SCALE: 1" = 400'

OCTOBER 12, 2011

EXHIBIT 2B.1



TEMPORARY EASEMENT AREA

OIL & GAS OPERATIONS AREA

g PROPOSED FUTURE PIPELINE EASEMENT (50' TEMPORARY & 30' PERMANENT)

PROPOSED ACCESS

encana
natural gas

TOWNSHIP 1 NORTH, RANGE 68 WEST
SECTION 8: NE¼SE¼
WELD COUNTY, COLORADO

SCALE: 1" = 150'

OCTOBER 10, 2011

3799568 10/18/2011 12:26P Weld County, CO
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Exhibit 3
to
Surface Use Agreement effective September 27, 2011
by and among Anadarko Land Corp., Anadarko E&P Company LP, Kerr-McGee Oil & Gas Onshore LP, Kerr-McGee Gathering LLC (for the limited purposes described herein), Encana Oil & Gas (USA) Inc. and Tallgrass Investors, LLC

AGREEMENT FOR RELOCATION OF PIPELINE AND RIGHT-OF-WAY

THIS AGREEMENT ("Agreement") is entered into this ____ day of _____, 20__, by and between **Tallgrass Investors, LLC** ("Tallgrass"), whose address is 2500 Arapahoe Avenue, Suite 220, Boulder, Colorado 80302 and **Kerr-McGee Gathering LLC** ("KMGG"), a Colorado limited liability company, whose address is 1099 18th Street, Denver, Colorado 80202.

RECITALS

A. KMGG is the successor in interest to a Right-of-Way Grant ("Easement") across a portion of the ____ of Section ____, Township 1 North, Range 68 West of the 6th P.M. in Weld County, Colorado. The Easement was originally conveyed to _____ for natural gas pipeline purposes by instrument recorded_____, reception #_____, of the records of the Weld County Clerk and Recorder.

B. Tallgrass is the current owner of a portion of the ___ of Section ___, Township 1 North, Range 68 West, 6th P.M., Weld County, Colorado (the "Property").

C. Tallgrass plans to develop the surface of the Property as a part of a residential development known as Bridgewater.

D. In order to accommodate the proposed development of the Property by Tallgrass, KMGG agrees to release a portion of the Easement lying within and across the Property and in consideration therefore, Tallgrass agrees to provide a Right-of-Way so that KMGG's pipeline(s) can be physically relocated and operated.

NOW, THEREFORE, in consideration of the covenants contained herein and the mutual benefits to be derived, KMGG and Tallgrass agree as follows:

1. Partial Release. KMGG shall execute and deliver a Partial Release of Easement (Exhibit "D") relinquishing and quitclaiming unto Tallgrass, the Easement, insofar, and only insofar, as it crosses or lies within the Property. Said Partial Release of Easement will be provided after delivery of the new Right-of-Way, as provided below, and after the physical relocation of the pipeline(s) and the tie-in of the relocated pipeline(s).

2. Amendment of Right-of-Way. Upon removal and rerouting of the existing pipelines from their current locations, KMGG shall execute and deliver an Amendment of Right-of-Way on the form attached hereto as Exhibit "A" and incorporated herein by this reference, amending permanently KMGG's pipeline Right-of-Way to the route(s) set forth and described in Exhibit "B" attached hereto which shall be attached to the Amendment as Exhibit "A". The Amendment will be provided after the physical relocation of the pipeline(s) and the tie-in of the relocated pipeline(s).

3. Conveyance of Right-of-Way. Tallgrass hereby agrees to provide and deliver to KMGG, prior to the actual placement and operation of new pipeline, an executed and recordable new Right-of-Way conveying unto KMGG, its successors and assigns, a perpetual right-of-way and easement for pipeline purposes on the form attached hereto as Exhibit "C". The new Right-of-Way shall be for the purposes of, and convey rights to survey, construct, install, maintain, inspect, operate, repair, replace, modify, change the size of, reconstruct, mark, monitor, abandon or remove, at KMGG's election, pipelines and all appurtenances, above or below ground, reasonably necessary or convenient for the transportation or transmission of oil, gas, petroleum products, water, hydrocarbons, and any other substances, whether fluid or gaseous, and any products, derivatives, combinations or mixtures of any of the foregoing. The width of the New Right-of-Way shall be _____ feet (___') during construction of the relocated portion of the pipeline(s) and any maintenance thereto, and subsequent to construction shall be _____ feet (___').

4. Title and Authority. Tallgrass represents and warrants to KMGG that Tallgrass is the sole owner in fee simple of the lands described in Exhibit "B" and Exhibit "C", being the route(s) of the Amended Right-of-Way and new Right-of-Way, respectively, and that Tallgrass has full power, right and authority to execute and deliver the Amendment of the Right-of-Way and new Rights-of-Way.

5. Senior Rights. KMGG acknowledges that all routes are non-exclusive and agrees that it will not object to the concurrent use of the routes by Tallgrass, utilities providers and other operators as Tallgrass may grant from time to time; provided, however, that such concurrent use does not in any way interfere with the use of the routes by KMGG. All pipes shall be placed with a minimum horizontal clearance of ten (10) feet from all other pipelines and utilities; and a minimum vertical clearance of eighteen (18) inches from all other pipelines and utilities. KMGG's "General Guidelines for Design and Construction Activities On or Near Kerr- McGee Gathering LLC and Kerr- McGee Oil & Gas Onshore LP Pipelines and Related Facilities" shall be strictly adhered to at all times. Said General Guidelines are attached hereto as Exhibit "F". Tallgrass further represents and warrants that it has full power, right and authority to enter into this Agreement and to make the covenants set forth herein.

6. Title Insurance. Tallgrass must deliver to KMGG a title commitment from an insurer acceptable to KMGG with any request for the relocation of any pipeline. If any of the exceptions contained in Schedule B-2 of said title commitment are (i) senior liens or encumbrances on the land upon which the right(s)-of-way to be granted to KMGG pursuant to this Agreement are to be located; or (ii) deemed by KMGG to infringe on its right of free use and enjoyment of new right(s)-of-way granted under this Agreement, the liens or encumbrances must be released or subordinated and any infringements must be cured by Tallgrass prior to the relocation of any pipelines. Prior to commencing any relocation activities, Tallgrass must furnish KMGG with a policy of title insurance insuring KMGG's title to its right(s)-of-way against any senior lien or encumbrance and against any interest that may interfere with KMGG's quiet enjoyment of the right(s)-of-way to be granted pursuant to this Agreement. KMGG will not be required to relocate any pipeline unless and until it has been furnished with a policy of title insurance that is satisfactory to it.

7. Pipeline Relocation Expense. KMGG has prepared a good faith estimate of the costs and expenses to be incurred in the pipeline relocation project and a summary of those costs and expenses is set forth on Exhibit "E" hereto. Costs include KMGG's corporate overhead of fifteen percent (15%) for the legal, engineering, and other administrative costs necessary to process and complete the relocation. Upon execution of this Agreement, Tallgrass will pay

KMGG the total estimated cost of pipeline relocation, which is $_____. It is understood that this amount is only an estimate and that Tallgrass shall be obligated to pay or reimburse KMGG for all actual costs and expenses related to the pipeline relocation. Upon conclusion of the relocation, the parties shall reconcile the costs incurred and payments made, with appropriate adjustments and reimbursements to Tallgrass or supplemental payments to KMGG being made within one-hundred twenty (120) days after the pipeline relocation is completed.

8. Amendments. This Agreement cannot be modified, except by a written agreement signed by both parties hereto.

9. Binding Effect. The rights granted herein may be assigned in whole or in part, and the terms, conditions, and provisions of this Agreement shall be a covenant running with the Property and shall extend to and be binding upon the heirs, executors, administrators, personal representatives, successors, and assigns of Tallgrass and KMGG.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

TALLGRASS INVESTORS, LLC

By: _____

Title: _____

KERR-MCGEE GATHERING LLC
a Colorado limited liability company

By: _____
_____, Agent and Attorney-in-Fact

STATE OF COLORADO)
) ss.
COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 201_, by _____, as _____, on behalf of _____ .

Witness my hand and official Seal.

My Commission Expires:_____

_____
Notary Public

(SEAL)

STATE OF)
)ss.
COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 201_, by _____ as Agent and Attorney-in-Fact for Kerr-McGee Oil & Gas Onshore LP, a Delaware Limited Partnership, in its capacity as Manager of Kerr-McGee Gathering LLC, a Colorado limited liability company, on behalf of such company.

Witness my hand and official Seal.

My Commission Expires: _____

_____
Notary Public

(SEAL)

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Exhibit 4
to
Surface Use Agreement effective September 27, 2011
by and among Anadarko Land Corp., Anadarko E&P Company LP, Kerr-McGee Oil & Gas Onshore LP, Kerr-McGee Gathering LLC (for the limited purposes described herein), Encana Oil & Gas (USA) Inc. and Tallgrass Investors, LLC

RIGHT-OF-WAY GRANT

THIS RIGHT-OF-WAY GRANT ("Grant") is made this ____ day of _____, 20__, from TALLGRASS INVESTORS, LLC with an address of 2500 Arapahoe Avenue, Suite 220, Boulder, Colorado 80302 ("Grantor") to _____, with an address of _____ ("Grantee"). The parties agree as follows:

For and in consideration of Ten Dollars ($10.00) and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Grantor hereby grants, conveys and warrants unto Grantee, its successors and assigns, a perpetual right-of-way(s) and easement(s) to survey, construct, maintain, inspect, operate, repair, replace, modify, change the size of, reconstruct, mark, monitor, abandon or remove, at Grantee's election, pipelines and all appurtenances, below and/or above ground, including but not limited to, launchers and receivers, convenient for the transportation or transmission of oil, gas, petroleum products, water, hydrocarbons and any other substances, whether fluid, solid or gaseous, and any products, derivatives, combinations or mixtures of any of the foregoing, in, on, over, under, or through the lands situated in Weld County, State of Colorado, being generally described as follows and more specifically described on Exhibit "A" attached hereto and made a part hereof:

TOWNSHIP 1 NORTH, RANGE 68 WEST, 6TH PM
Section ___: ____

The specific route and course of the right-of-way(s) and easement(s) conveyed hereby ("Right-of-Way Lands") is more particularly described on Exhibit "B" attached hereto and made a part hereof. The width of the Right-of-Way Lands during construction shall be _____ feet (___') and subsequent to construction shall be _____ feet (___').*

Grantor represents and warrants to Grantee that Grantor is the sole owner in fee simple of the Right-of-Way Lands and has full right, power and authority to make this Grant.

Grantee shall lay all pipe at a depth of not less than 36 inches. Grantee shall repair and/or restore any fence on or adjacent to the Right-of-Way Lands removed or severed by Grantee in the course of the operations provided for in this Grant. If necessary to prevent the escape of Grantor's livestock, Grantee shall construct temporary gates or fences.

**Fifty (50) feet construction/thirty (30) feet permanent for Section 8 and Seventy-Five (75) feet construction/fifty (50) feet permanent for Section 18.*

Grantee shall have all rights, privileges and benefits necessary or convenient for the full use and enjoyment of this Grant, including but not limited to, the right of ingress and egress over and across Grantor's lands lying adjacent to the Right-of-Way Lands for any and all purposes necessary and incidental to exercising Grantee's rights hereunder. Grantor agrees not to build, create, construct or permit to be built, created or constructed, any obstruction, building, fence, landscaping, reservoir, engineering works or other structures or improvements over, under, on or across the Right-of-Way Lands without prior written consent of Grantee.

Grantee shall be obligated to pay for, repair, replace or otherwise compensate Grantor for any damages resulting from Grantee's activities and operations on the Right-of-Way Lands, and Grantor shall pay for, reimburse, indemnify and hold Grantee harmless from any and all claims or damages resulting from Grantor's activities on the Right-of-Way Lands. Grantor shall have the right to use and enjoy the Right-of Way Lands, subject to the rights herein granted.

This Grant cannot be modified, except in writing signed by Grantor and Grantee.

The rights granted herein may be assigned in whole or in part, and the terms, conditions, and provisions of this Grant are a covenant running with the land and shall extend to and be binding upon the successors and assigns of Grantor and Grantee.

Grantee agrees to level and restore any lands that may have excessive settling and sufficiently compact the soil within a reasonable period of time after completion of construction.

This Grant may be executed in counterparts each of which shall be considered one and the same agreement.

IN WITNESS WHEREOF, the parties have executed this Grant as of the date first above written.

Grantor:
Tallgrass Investors, LLC

By: _____
Name: _____
Its: _____

Grantee:
_____

By: _____
Name: _____
Agent & Attorney-in-Fact

STATE OF COLORADO)
) ss.
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____, 201__, by _____ as _____ of Tallgrass Investors, LLC.

Witness my hand and official Seal.

My Commission Expires:_____

_____

Notary Public

STATE OF _____)
) ss.
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of_____, 201_, by _____, as Agent and Attorney-in-Fact of _____, on behalf of such company.

Witness my hand and official Seal.

My Commission Expires:_____

_____

Notary Public

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Exhibit 5

to

Surface Use Agreement effective September 27, 2011 by and among Anadarko Land Corp., Anadarko E&P Company LP, Kerr-McGee Oil & Gas Onshore LP, Kerr-McGee Gathering LLC (for the limited purposes described herein), Encana Oil & Gas (USA) Inc. and Tallgrass Investors, LLC

See attached Guidelines consisting of four (4) pages.

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General Guidelines for Design and Construction Activities On or Near Kerr- McGee Gathering LLC Pipelines and Related Facilities

This list of design, construction and contractor requirements, including but not limited to the following, is for the design and installation of foreign utilities or improvements on Kerr McGee Gathering LLC (KMGG) right-of-way (ROW). These are not intended to, nor do they waive or modify any rights KMGG may have under existing easements or ROW agreements. For information regarding KMGG's rights and requirements as they pertain to the existing easements, please reference existing easements and amendments documents. This list of requirements is applicable for KMGG facilities on easements and in road rights of ways only. Encroachments on fee property should be referred to the Land & ROW Department. Any reference to KMGG in the below requirements is meant to include and apply to any Kerr McGee entity.

Design

- KMGG shall be provided sufficient prior notice of planned activities involving excavation, blasting, or any type of construction on KMGG's ROW or near its facilities. This is to determine and resolve any location, grade or encroachment problems and allow for the protection of KMGG's facilities and the general public. This prior notification is to be made **before** the actual work is to take place.

- The encroaching entity shall provide KMGG with a set of drawings for review and a set of final construction drawings showing all aspects of the proposed facilities in the vicinity of KMGG's ROW. The encroaching entity shall also provide a set of "as-built drawings" and submit to KMGG, showing the facilities in the vicinity of KMGG's ROW upon completion of the work.

- Only facilities shown on drawings reviewed by KMGG will be approved for installation on KMGG's ROW. All drawing revisions that affect facilities proposed to be placed on KMGG's ROW must be approved by KMGG in writing.

- KMGG shall approve the design of all permanent road crossings.

- Any repair to surface facilities following future pipeline maintenance or repair work by KMGG on its "prior rights" ROW will be at the expense of the developer or landowner. In addition, any repair to surface facilities following future pipeline maintenance or repair work by KMGG on replacement ROW granted to relocate KMGG facilities will also be done at the expense of the developer or landowner unless expressly addressed in surface use agreements and approved in writing by KMGG.

- The depth of cover over the KMGG pipelines shall not be increased or reduced nor surface modified for drainage without KMGG's written approval.

- Construction of any permanent structure within KMGG pipeline easement is **not** permitted without written approval by KMGG.

- Planting of shrubs and trees is not permitted on KMGG pipeline easement without written approval by KMGG.

- Irrigation equipment i.e. backflow prevent devices, meters, valves, valve boxes, etc. shall not be located on KMGG easement without written approval by KMGG.

- Foreign utility installations, i.e., distribution gas, oil and gas gathering, water, electric, telephone, cable and sewer lines, etc., may cross perpendicular to KMGG's pipeline within the ROW, provided that a minimum of eighteen inches (18") of vertical clearance is maintained between KMGG pipeline(s) and the foreign utility. Any installation by a foreign utility with less than 18" of vertical separation is not allowed without written approval by KMGG. In no case will vertical separation be less than 12". Constant line elevations must be maintained across KMGG's entire ROW width, gravity drain lines are the only exception and must be approved in writing. Foreign line crossings below the KMGG pipeline must be evaluated by KMGG to ensure that a significant length of the KMGG line is not exposed and unsupported during construction. Foreign line crossings above the KMGG pipeline with less than 18" of clearance must be evaluated by KMGG to ensure that additional support is not necessary to prevent settling on top of the KMGG natural gas pipeline. A KMGG representative must be on site during any crossing activities to verify clearance depths and to assure the integrity and support of the KMGG facility. All installations of foreign crossings done by boring and or jacking require the KMGG facility to be exposed to verify clearances.

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General Guidelines for Design and Construction Activities On or Near Kerr- McGee Gathering LLC Pipelines and Related Facilities

- Foreign utilities shall not run parallel to KMGG pipelines within the KMGG easement without written permission by KMGG. A minimum of 10 feet of horizontal separation must be maintained in parallel installations whether the foreign utility is placed within the KMGG easement or adjacent to the KMGG easement. Any deviation from the 10' horizontal requirement must be approved in writing by KMGG and an "as built survey" provided to KMGG after installation. In the instance that high voltage electric lines, greater than 20kV, are installed parallel to a KMGG pipeline a minimum horizontal distance of 15' must be maintained.

- The foreign utility should be advised that KMGG maintains cathodic protection on its pipelines and facilities. The foreign utility must coordinate their cathodic protection system with KMGG's. At the request of KMGG, foreign utilities shall install (or allow to be installed) cathodic protection test leads at all crossings for the purposes of monitoring cathodic protection interference. The KMGG CP technician and the foreign utility CP technician shall perform post construction CP interference testing. Interference issues shall be resolved by mutual agreement between foreign utility and KMGG. All costs associated with the correction of cathodic protection interference issues on KMGG pipelines as a result of the foreign utility crossing shall be borne by the foreign utility for a period of one year from date the foreign utility is put in service.

- The developer shall understand that KMGG, whether specifically required per federal law or by company standard, will mark the routing of its underground facilities with aboveground pipeline markers and test leads and maintain those markers and test leads. Markers will be installed at every point the pipeline route changes direction and adequate markers will be installed on straight sections of pipeline to insure, in the sole opinion of KMGG, the safety of the public, contractor, KMGG personnel and KMGG facilities.

- On all foreign utility crossings and / or encroachments, metallic foreign lines shall be coated with a suitable pipe coating for a distance of at least 10 feet on either side of the crossing.

- AC Electrical lines must be installed in conduit and properly insulated.

- On all foreign pipelines, DOT approved pipeline markers shall be installed so as to indicate the route of the foreign pipeline across the KMGG ROW.

- No power poles, light standards, etc. shall be installed in the KMGG easement without written approval by KMGG.

- KMGG installs above ground appurtenances at various locations that are used in the operation of its facilities. Kerr McGee will install protective enclosures at the above ground appurtenances to protect them from outside damage. The design and placement of these above ground appurtenances and protective enclosures is done at KMGG's sole discretion, and may exceed any regulatory requirements.

Construction

- If KMGG will be relocating KMGG facilities for any entity, grading in the new KMGG ROW shall be +/- 6 inches before KMGG will mobilize to complete the relocation. Final cover after the completion of the project will not be manipulated by the requesting entity to be less than 48" nor more than 72". All cover that exceeds 72" or less than 48" will be approved in writing by KMGG. This does not preclude KMGG from installing the pipeline at a minimum cover of 36" as provided for in CFR 49 Part 192. Cover during all construction activities will NEVER be less than 36" unless approved in writing and a KMGG representative is on site during the time cover is reduced.

- The entity requesting relocation shall survey top of pipe after installation but before backfill to determine proper final elevation of KMGG facilities. The entity requesting relocation is solely responsible for the final depth of cover over the relocated KMGG facility. Any deviation from cover requirements as outlined above will be corrected at the sole expense of the entity requesting relocation.

- Contractors shall be advised of KMGG's requirements and be contractually obligated to comply.

- The continued integrity of KMGG's pipelines and the safety of all individuals in the area of proposed work near KMGG's facilities are of the utmost importance. Therefore, contractor must meet with KMGG representatives prior to construction to provide and receive notification listings for appropriate area operations and emergency personnel. **KMGG's on-site representative will require discontinuation of any work that, in his or her opinion, endangers the operations or safety of personnel, pipelines or facilities.**

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General Guidelines for Design and Construction Activities On or Near Kerr- McGee Gathering LLC Pipelines and Related Facilities

- **The Contractor must expose all KMGG pipelines prior to crossing to determine the exact alignment and depth of the lines. A KMGG representative must be present.**

- The use of probing rods for pipeline locating shall be performed by KMGG representatives only, to prevent unnecessary damage to the pipeline coating. A KMGG representative shall do all line locating.

- Notification shall be given to KMGG at least 72 hours before start of construction. A schedule of activities for the duration of the project must be made available at that time to facilitate the scheduling of KMGG's work site representative. Any Contractor schedule changes shall be provided to KMGG immediately.

- Heavy equipment will not be allowed to operate directly over KMGG pipelines or in KMGG ROW unless written approval is obtained from KMGG. Heavy equipment shall only be allowed to cross KMGG pipelines at locations designated by KMGG. Haul roads will be constructed at all crossings. The haul roads will be constructed using lightweight equipment. The existing depth of cover over the pipeline must be verified. Cover will be added such that a total of 8' of fill exists over the pipeline and extends a minimum of 10' on each side of the pipeline. Depth of cover will then taper as required for equipment access. Steel plates may be used for load dissipation only if approved in writing by KMGG.

- Contractor shall comply with all precautionary measures required by KMGG, at its sole discretion to protect its pipelines. When inclement weather exists, provisions must be made to compensate for soil displacement due to subsidence of tires.

- Excavating or grading which might result in erosion or which could render the KMGG ROW inaccessible shall not be permitted unless the contractor agrees to restore the area to its original condition and provide protection to KMGG's facility. At no time will cover be reduced to less than 36" without written approval by KMGG and a KMGG representative on site.

- A KMGG representative shall be notified prior to construction activities within twenty-five (25) feet of a KMGG pipeline or above ground appurtenance. The contractor **shall not** be allowed to work within twenty-five (25) feet of KMGG facilities without approval from the KMGG representative. The KMGG representative may or may not remain on site during the entire construction activity. Contractor shall use extreme caution and take appropriate measures to protect KMGG facilities. The contractor shall call the KMGG representative prior to backfilling around the KMGG facility to allow for a final inspection of the KMGG facility.

- Ripping is only allowed when the position of the pipe is known and not within ten (10) feet of KMGG facility. KMGG personnel must be present.

- Temporary support of any exposed KMGG pipeline by Contractor may be necessary if required by KMGG's on-site representative. Backfill below the exposed lines and 12" above the lines shall be replaced with sand or other selected material as approved by KMGG's on-site representative and thoroughly compacted in 12" lifts to 95% of standard proctor dry density minimum or as approved by KMGG.'s on-site representative. This is to adequately protect against stresses that may be caused by the settling of the pipeline.

- No blasting shall be allowed within 1000 feet of KMGG's facilities unless blasting notification is given to KMGG Including complete Blasting Plan Data. A pre-blast meeting shall be conducted by the organization responsible for blasting.

- KMGG shall be indemnified and held harmless from any loss, cost of liability for personal injuries received, death caused or property damage suffered or sustained by any person resulting from any blasting operations undertaken within 500 feet of its facilities. The organization responsible for blasting shall be liable for any and all damages caused to KMGG's facilities as a result of their activities whether or not KMGG representatives are present. KMGG shall have a signed and executed Blasting Indemnification Agreement before authorized permission to blast can be given.

- No blasting shall be allowed within 200 feet of KMGG's facilities unless blasting notification is given to KMGG a minimum of one week before blasting. The organization responsible for blasting must complete Blasting Plan Data. KMGG shall review and analyze the blasting methods. A written blasting plan shall be provided by the organization responsible for blasting and agreed to in writing by KMGG. A written emergency plan shall be provided by the organization responsible for blasting.

- KMGG shall have a signed and executed Blasting Indemnification Agreement before authorized permission to blast can be given. A pre-blast meeting shall be conducted by the organization responsible for blasting.

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General Guidelines for Design and Construction Activities On or Near Kerr- McGee Gathering LLC Pipelines and Related Facilities

- Any contact with any KMGG facility, pipeline, valve set, etc. shall be reported immediately to KMGG. If repairs to the pipe are necessary, they will be made and inspected before the section is re-coated and the line is back-filled.
- KMGG personnel shall install all test leads on KMGG facilities.

Local Kerr-McGee Gathering LLC Representation:

Operations Manager	Kevin Osif, P.E.	Phone: (303) 655-4307
Staff Engineer:	Joseph E. Sanchez, P.E.	Phone: (303) 655-4319
Pipeline Foreman:	James Phillips	Phone: (303) 655-4343
Construction Foreman:	Jim McQuiston	Phone: (303) 655-4326
Construction Supervisor	Darrel Gentry	Phone: (303) 655-4326

Emergency Contacts:

On call supervisor	Phone: (303) 559-4001
Kerr McGee 24 hour emergency number	Phone: (303) 659-5922
One Call Emergency	Phone: 811

4286965 03/21/2017 09:10 AM
Total Pages: 3 Rec Fee: $23.00
Carly Koppes - Clerk and Recorder, Weld County, CO

MEMORANDUM OF SURFACE USE AGREEMENT

This Memorandum of Surface Use Agreement ("Memorandum") is made and entered into effective this 16 day of March, 2017, by and between DAYBREAK RECOVERY ACQUISTION LLC, a Delaware limited liability company, with an address of 1251 Avenue of the Americas, 50th Floor, New York, NY 10020, (hereinafter referred to as "Owner") and KERR-MCGEE OIL & GAS ONSHORE LP (hereinafter referred to as "KMG"), with an address of 1099 18th Street, Suite 1800, Denver, CO 80202; and KERR-MCGEE GATHERING LLC ("KMGG"), also with an address of 1099 18th Street, Suite 1800, Denver, CO 80202. Owner, KMG and KMGG are sometimes referred to alone or together as a "Party" or the "Parties."

A. Owner owns the surface estate of that certain tract of land more particularly described on Exhibit "A" attached hereto, being a portion of the SE/4 of Section 8, Township 1 North, Range 68 West, 6th P.M., Weld County, Colorado (hereinafter referred to as the "Section 8 Property");

B. KMG has the right to develop its oil and gas leasehold estate by drilling wells on the Section 8 Property ("Future Wells"). Surface ownership of the Section 8 Property is subject to the rights of the oil and gas leasehold estate, all or a portion of which is owned by KMG;

C. The Parties have entered into an agreement that sets forth the Parties' rights and obligations regarding the relationship between the development of the Section 8 Property by Owner and KMG's operation and development of its oil and gas leasehold estate, such agreement entitled the "Surface Use Agreement" ("Agreement"); and

D. The Parties desire, through the execution and recording of this Memorandum, to reaffirm and give notice of the Agreement and the rights and interests created thereby.

NOW, THEREFORE, in consideration of the covenants and mutual promises set forth in the Agreement and this Memorandum of Agreement, including in the recitals, the Parties agree as follows:

1. The Parties have reached an agreement regarding development of KMG's leasehold estate, including but not limited to the location of wells, production facilities, access routes and pipelines on the Section 8 Property, under the terms, provisions and conditions set forth in the Agreement;

2. This Memorandum is not a complete summary of the Agreement and shall not be used in interpreting the provisions of the Agreement, nor in any way or manner does it amend, modify or affect the terms, provisions, conditions and exceptions of the Agreement, and the Agreement shall govern and control in all respects, the duties, obligations, covenants, warranties and agreements of the Parties;

3. Exhibit A is incorporated into this Memorandum by this reference;

4. This Memorandum shall be recorded in the Office of the Clerk and Recorder of Weld County; and

5. This Memorandum may be executed in counterparts, each of which shall be deemed an original, but together of which shall constitute one and the same instrument. Facsimile and/or scanned signatures shall have the same force and effect as original signatures.

IN WITNESS WHEREOF, the Parties have executed this instrument on the dates set forth in the acknowledgements, but to be effective on the date first above written.

KERR-MCGEE OIL & GAS ONSHORE LP

By: _____
Name: Lindsay N. Tallee
Its: Agent & Attorney-in-Fact

DAYBREAK RECOVERY ACQUISITION LLC,
A Delaware limited liability company

By: _____
Name: Jonathan Shumaker
Its: ~~Authorized Signatory~~

KERR-MCGEE GATHERING LLC

By: _____
Name: Lindsay N. Jaffee
Its: Agent & Attorney-in-Fact

ACKNOWLEDGEMENTS

STATE OF NEW YORK)
) ss.
COUNTY OF WESTCHESTER)

The foregoing instrument was acknowledged before me this 16 day of MARCH, 2017, by Jon Shumaker, individually, and as AUTHORIZED SIGNATORY of Daybreak Recovery Acquisition LLC, a Delaware limited liability company.

Witness my hand and official seal.

[S E A L]

_____
Notary Public
My Commission Expires: _____

HSINYI LONKER
Notary Public, State of New York
No. 01LO6222974
Qualified in Westchester County
Commission Expires June 1, 2018

STATE OF COLORADO)
) ss.
COUNTY OF Denver)

The foregoing instrument was acknowledged before me this 20 day of March, 2017, by Lindsay N Jaffee as Agent & Attorney-in-Fact of Kerr-McGee Oil & Gas Onshore LP.

Witness my hand and official seal.

[S E A L]

REBECCA GILL
Notary Public – State of Colorado
Notary ID 20014036429
My Commission Expires Jan 8, 2018

_____
Notary Public
My Commission Expires: 01.08.2018

STATE OF COLORADO)
) ss.
COUNTY OF Denver)

The foregoing instrument was acknowledged before me this 20 day of March 2017, by Lindsay N Jaffee as Agent & Attorney-in-Fact of Kerr-McGee Gathering LLC.

Witness my hand and official seal.

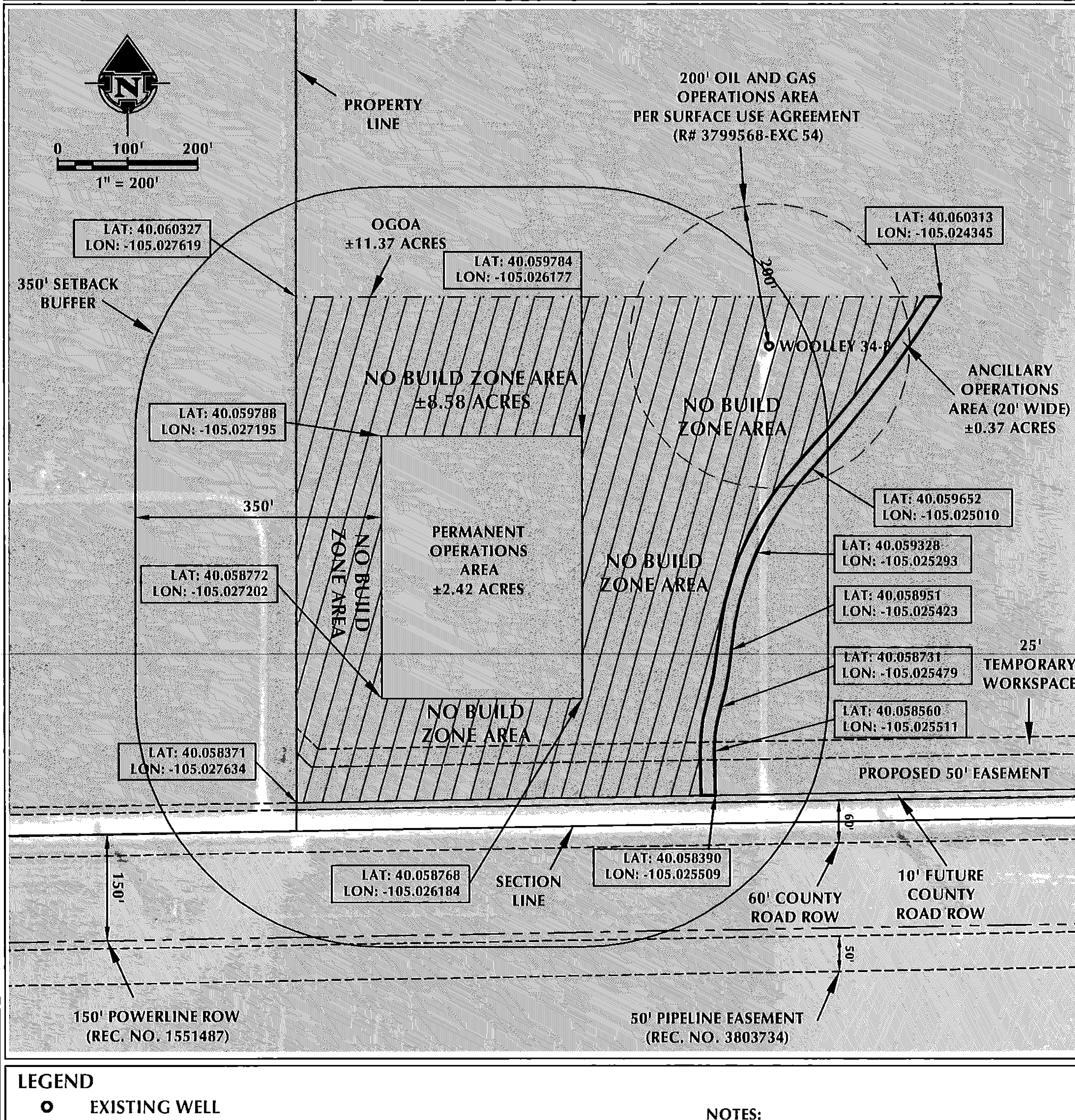
[S E A L]

_____
Notary Public
My Commission Expires: 01.08.2018

REBECCA GILL
Notary Public – State of Colorado
Notary ID 20014036429
My Commission Expires Jan 8, 2018

EXHIBIT A TO MEMORANDUM

SW1/4 SE1/4 SECTION 8, TOWNSHIP 1 NORTH, RANGE 68 WEST, 6TH P.M.



LEGEND

- o EXISTING WELL
- — · · — OIL AND GAS OPERATIONS AREA
- ▱▱ NO BUILD ZONE AREA

NOTES:

1. THIS EXHIBIT IS NOT A PROPERTY BOUNDARY SURVEY AND CANNOT BE RELIED UPON TO DETERMINE OWNERSHIP.
2. LATITUDE AND LONGITUDE COORDINATES ARE NAD 83 (2011)(EPOCH:2010)

609 CONSULTING, LLC
LOVELAND OFFICE 1635 Foxtrail Drive, Suite 204 Loveland, Colorado 80538 Phone 970-776-4331
SHERIDAN OFFICE 1095 Saberton Avenue Sheridan, Wyoming 82801 Phone 307-674-0609

DATE SURVEYED:	N/A
DATE:	10/28/16
DRAFTER:	JFE
REVISED:	2/13/16

DATA SOURCES:
- AERIAL COURTESY OF ESRI, INC.
- WATER WELLS COURTESY OF COLORADO DIVISION OF WATER RESOURCES

PREPARED FOR:
Kerr-McGee Oil & Gas Onshore L.P.

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