KT
KT ENGINEERING
ENGINEERS • SURVEYORS
PDR
PROJECT:
NORTH WESTERLY
REPORT:
PHASE I DRAINAGE REPORT
ISSUE DATE:
OCTOBER 31, 2022
REVISIONS:
12.12.23 | 05.14.24 | 09.20.24 | 03.24.25

Contents

i. ENGINEER'S CERTIFICATION ii
ii. TOWN ACCEPTANCE ii
I. GENERAL LOCATION AND DESCRIPTION 1
A. Location 1
B. Description of the Property 1
II. DRAINAGE BASINS 1
A. Major Basin 1
B. Sub-basin Description 2
III. DRAINAGE FACILITY DESIGN 2
A. General Concept 2
IV. SUMMARY 5
V. REFERENCES 5

APPENDIX A
a) General Location Map
b) Design Charts & Tables

APPENDIX B
a) Existing Hydrologic Calculations
b) Hydrologic Calculations

APPENDIX C
a) Existing Hydraulic Calculations
b) Hydraulic Calculations
c) Detention Pond Calculations
d) Culvert Calculations

APPENDIX D
a) Erie OSP Reference Material

APPENDIX E
a) NRCS Soils Report

APPENDIX F
a) Excerpts from Colliers Hill Filing 4G Phase III Drainage Report
b) Excerpts from the Final Drainage Report for Erie High School

i. ENGINEER'S CERTIFICATION

"I hereby certify that this Phase I Drainage Report for the design of North Westerly was prepared by me (or under my direct supervision) in accordance with the provisions of the *Town of Erie Standards and Specifications for Design and Construction* 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."

Owen Keith Keenan
Registered Professional Engineer
State of Colorado No. 47677

ii. 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: _____ _____
Deputy Public Works Director Date

I. GENERAL LOCATION AND DESCRIPTION

A. Location

The North Westerly site is bounded to the north by Weld County Road 10, to the east by Weld County Road 7, to the south by Erie Parkway, and to the west by Weld County Road 5. The proposed site abuts Soaring Heights PK-8 School and Erie High School on the west side of the site and a rural subdivision to the east platted as Carlson Subdivision. On the north side of Weld County Road 10 and east side of Weld County Road 7 are rural large lot residential and agricultural land uses. South of Erie Parkway is the Westerly Development and to the West of Weld County Road 5 is the Colliers Hill Development. Both developments are located in the Town of Erie. The Westerly Development is a residential master-planned community consisting of approximately 3,100 lots on 800 acres. The Colliers Hill Development is a residential master-planned community consisting of approximately 2,800 lots on 960 acres. Both Westerly and Colliers Hill are on-going developments.

North Westerly is located in the northwest quarter and the south half of Section 16, Township 1 North, Range 68 West of the 6th Principal Meridian.

A General Location Map has been provided in Appendix A.

B. Description of the Property

The North Westerly site is 392 acres in size and will be a mixed-use development containing both single-family, multi-family and commercial land uses. The site is currently undeveloped and covered with native grasses and shrubs. The on-site soils are categorized as Hydrologic Soil Group C or D soils. There are no major drainage ways within the property.

The Community Ditch traverses the site from the east to west and then north. The Community Ditch runs approximately 2.1 miles within the subject site.

There are mapped wetlands within the site that are associated with the Community Ditch. It is anticipated that some of these wetlands along the community ditch will be impacted by street crossings. Another area of wetlands just outside of the Community Ditch may be impacted by the development as well. A Jurisdictional Determination will be obtained from the U.S. Army Corps of Engineers (USACE) prior to the Preliminary Plat approval. It is anticipated that the wetlands are considered non-jurisdictional wetlands, however, if they are determined to be jurisdictional by the USACE, mitigation measures shall meet USACE requirements.

The site is located within the study limits of the Erie Outfall Systems Plan East of Coal Creek (Erie OSP). The Community Ditch acts a high point throughout the site and the site tends to drain away from the Community Ditch in all directions. The drainage basins are discussed in more detail below.

II. DRAINAGE BASINS

A. Major Basin

The North Westerly site is located in both Boulder Creek and Godding Hollow Drainage Basins. The Boulder Creek Watershed is approximately 15.2 square miles and generally flows to the west/northwest. The Godding Hollow Watershed is approximately 4.4 square miles and generally flows to the northeast. The Community Ditch which traverses the site is in general the basin divide of the two basins.

The North Westerly site does not lie within the 100-year floodplain per FIRM Map 08123C2070E dated January 20, 2016. North Westerly is located within the study area of the *Town of Erie Outfall System Plan (East of Coal Creek)* as prepared by Merrick and dated January 2020 (Erie OSP). Generally, the site flows away from the Community Ditch which traverses the site. Approximately 112 acres of the site drains to Boulder Creek and 280 acres of the site drains to Godding Hollow.

B. Sub-basin Description

Proposed Master Plan Improvements

The North Westerly site is located within Subbasins 433, 434, 651, 663, 664, 1433, 1434, 1661, and 1662 of the Erie OSP. The site has six distinct outfall points located along the east, north, and west property lines either at road culvert crossings, or some road crossings without a culvert in place. Extended Detention Basins (EDBs) will be constructed in 6 locations at the 6 distinct outfall points noted above. EDBs will reduce peak flowrates to less than historic peak flowrates. Release locations are determined based on historical flow paths and in general drainage patterns will not change with this development. It is anticipated that the Community Ditch will remain as an open channel throughout the site. The Community Ditch will be piped at proposed street crossings. It is also anticipated that culverts will be designed and constructed within the perimeter roadways in areas where the existing drainage conditions warrant a conveyance. Several Erie OSP improvements are proposed with this project including two detention ponds and an open channel.

Proposed Land Use

Proposed land uses will consist of a mix of low density residential, medium density residential, high density residential and commercial areas. It is anticipated there will be a community amenity such as (but not limited to) a clubhouse and pool area, live-work area combining residential and commercial uses, and commercial areas. At this time it is unknown what the exact configuration of these areas will be. A more detailed study of actual imperviousness percentages based on proposed land use will be provided in the Phase II Drainage Report. This drainage report has assumed values of 50% applied to potential single family areas and 65% to higher density residential and commercial areas. It is understood that these numbers will be adjusted in the future as the project becomes more refined.

III. DRAINAGE FACILITY DESIGN

A. General Concept

In general, flows from the developed site will be collected in the site's proposed storm drain system or open channel and conveyed to an EDB. Flow paths and drainage basins will in general be similar in both pre-developed and post developed conditions. Outfall points will remain at locations where they have historically discharged to the extent possible. The Colorado Urban Hydrograph Procedure (CUHP) as presented in the Urban Storm Drainage Criteria Manual (USDCM) by the Mile High Flood District (MHFD) was utilized to determine historic and proposed storm runoff rates presented in this Phase I Drainage Report. Flows were routed using the EPA Storm Water Management Model (SWMM). Six EDBs are preliminarily proposed at each outfall point. It is anticipated that all the EDBs will be full spectrum, providing attenuated releases of the Water Quality Capture Volume (WQCV), Excess Urban Runoff Volume (EURV) and 100-year detention. For EDBs discharging to unincorporated Weld County the 100-year release rate has been determined in accordance with the Weld County Drainage Criteria (WCDC) Section 5.10.2 Detention. This section states that the 100-year release rates shall be based off the historic (undeveloped) 5-year, 1-hour storm for urbanizing areas. The historic 5-year, 1-hour release rate during the 100-year developed condition storm is more restrictive when compared to Town of Erie Standards which allows up to 1.00 cfs/acre to be released from a detention pond in the 100-year storm event for Type C & D soils. This criteria applies to EDBs A, D, E, and F. Below is a description of each EDB.

EDB A

EDB A is located at Design Point 1 and captures runoff from Subbasin A. Subbasin A is 30.5 acres and proposed runoff is generated by low-density residential areas with an assumed 50% imperviousness. EDB A will provide Full Spectrum (WQCV/EURV) and 100-year Detention. EDB A will release to unincorporated Weld County and will be restricted to a 100-year release rate of the historic 5-year runoff flowrate. The preliminary 100-yr SWMM pond size is 5.49 ac-ft. It is anticipated that that outflows will discharge into a roadside ditch on the east side of WCR 5. There is currently no culvert under WCR 10, however, overflows from this basin would overtop WCR 10 and continue north within rural residential lots. The proposed design diverts this water to a more suitable drainageway like the roadside ditch in WCR 5 where it continues north. The preliminary 100-year SWMM release rate is 1.9 cfs (0.06 cfs/acre).

EDB B

EDB B is located at Design Point 3 and captures runoff from Subbasin B and OSB. Subbasin B is 49.2 acres and proposed runoff in general is generated by low-density residential areas with an assumed 50% imperviousness. Subbasin OSB is 13.5 acres and consists of Soaring Heights PK-8 school. An existing detention pond collects developed runoff from Soaring Heights PK-8 school and discharges them to Subbasin B. The existing detention pond was ignored in this drainage analysis. OSB was assumed to have a 45% imperviousness. EDB B will provide Full Spectrum (WQCV/EURV) and 100-year Detention. The preliminary 100-yr SWMM pond size is 7.50 ac-ft. EDB B discharges to an existing 36-inch RCP that was extended to the North Westerly site by the Colliers Hill Filing 4G development. The receiving storm system was designed for a 100-year flowrate of 94.7 cfs per the Phase III Drainage Report for Colliers Hill Filing 4G. The preliminary 100-yr SWMM release rate is 62.2 cfs (0.99 cfs/acre) due to Town of Erie Standards and Specifications Table 800-4 which allows a detention pond release rate for Type C and D soils at 1.00 cfs/acre (Total Area = 49.2 acres [Basin B] + 13.5 acres [Basin OSB] = 62.7 acres). This release rate is lower than the existing runoff flowrates calculated for this area in the Colliers Hill Filing 4G Phase III Drainage Report.

EDB C

EDB C is located at Design Point 4 and captures runoff from Subbasin C. Subbasin C runoff in general is generated by higher density uses such as medium density and high density residential, live/work, and possibly commercial areas with an assumed imperviousness of 65%. EDB C will provide Full Spectrum (WQCV/EURV) and 100-year Detention. The preliminary 100-yr SWMM pond size is 7.18 ac-ft. EDB C discharges to an existing storm drain system that is associated with Erie High School. The existing storm drain system was not originally designed with the school. It was installed in 2014 after the track and football field were impacted by the 2013 front-range flooding. The existing storm drain is a 36-inch diameter RCP. This pipe was sized in a Drainage Letter/Update Report for Erie Highschool. The historic 100-yr flow to this pipe capturing off-site basins was calculated as 31.36 cfs. The preliminary 100-yr SWMM release rate is 30.7 cfs (0.64 cfs/acre). This release rate is in compliance with the revised modification letter.

EDB D

EDB D is located at Design Point 5 and captures runoff from Subbasin D. Subbasin D is 22.4 acres and proposed runoff is generated by higher density uses such as high density residential, live/work, and possibly commercial areas with an assumed imperviousness of 65%. EDB D will provide Full Spectrum (WQCV/EURV) and 100-year Detention. The preliminary 100-yr SWMM pond size is 4.37 ac-ft. EDB D will release to unincorporated Weld County and will be restricted to a 100-year release rate of the historic 5-year runoff flowrate. It is anticipated that ouflows will be piped and discharged at the location of an existing 24-inch CMP culvert that conveys flows to the east under WCR 7. The preliminary 100-yr SWMM release rate is 1.3 cfs (0.06 cfs/acre).

EDB E

EDB E is located at Design Point 7 and captures runoff from Subbasins E1 and E2. Subbasin E1 is 82.8 acres and Subbasin E2 is 80.7 acres. Runoff is generated by higher density uses such as medium and high density residential, live/work, and possibly commercial areas with an assumed imperviousness of 65%. EDB E will provide Full Spectrum (WQCV/EURV) and 100-year Detention. Ultimately, EDB E will release to unincorporated Weld County and will be restricted to a 100-year release rate of the historic 5-year runoff flowrate. The preliminary 100-yr SWMM pond size is 32.29 ac-ft. Flows from EDB E will be conveyed north in an open channel to Design Point 9. This open Channel is considered Outfall 975 Reach 6 in the Erie OSP. The preliminary 100-yr SWMM release rate is 5.7 cfs (0.03 cfs/acre).

EDB F

EDB F is located at Design Point 8 and captures runoff from Subbasin F. Subbasin F is 85.7 acres and proposed runoff is generated by low-density residential areas with an assumed 50% imperviousness. EDB E will provide Full Spectrum (WQCV/EURV) and 100-year Detention. Ultimately, EDB E will release to unincorporated Weld County and will be restricted to a 100-year release rate of the historic 5-year runoff flowrate. The preliminary 100-year SWMM pond size is 15.56 ac-ft. The preliminary 100-yr SWMM release rate is 3.6 cfs (0.04 cfs/acre). Flows from EDB F will combine with those from EDB E at Design Point 9 and an open channel will convey the combined flow of 9.3 cfs to the east to the roadside ditch along the south side of WCR 10 to the North Westerly property line.

Outfall 975 Reach 5

This is the portion the EDB E and EDB F outfall channel once it is conveyed east along the south side of WCR 10. Once off-site from North Westerly development, flows in the channel combine with the existing flows from basin OS1 and OS2. OS1 and OS2 combined are 161.2 acres consisting of the existing rural Carlson subdivision. Basins OS1 and OS2 were considered rural residential land uses and assigned an imperviousness of 21% which is per the Erie OSP (Future Land Use Map) with a small allowance for existing pavement. There is a low point in WCR 10 and an 36-inch RCP conveys flows to the north. The preliminary 100-yr SWMM flow is 264.9 cfs at this point (of which 9.4 cfs is from the North Westerly site). The existing culvert crossing will be upgrade to a propose (4) 3'Hx4'W RCBC to pass the existing flows plus pond outflows from EDB's E and F. It is anticipated that proposed flows to the box culvert crossing will be reduced when compared to the existing condition due to the stringent Weld County Drainage Criteria for EDB's E and F.

The storm drain system in residential areas will be designed based on the 2-year minor storm event and the 100-year major storm event. The storm drain system in commercial areas will be designed based on a 5-year minor storm event and a 100-year major storm event. All storm drain systems that receive runoff from commercial areas will be sized to intercept and convey runoff for the 5-year storm event from the commercial areas plus the 2-year storm event runoff from residential areas.

Tables and charts utilized for the calculations in this report are attached in Appendix A. Design tables and criteria were obtained from the 2024 Edition of the Town of Erie Standards and Specifications for the Design and Construction of Public Improvements, and/or the USDCM Revised in August 2018.

No adaptions from Erie Drainage Criteria are requested at this time.

IV. SUMMARY

A. Conclusion

The North Westerly drainage facilities will be designed to capture developed runoff and convey those flows to six on-site proposed Full Spectrum Extended Detention Ponds. Ponds A, D, E and F will release 100-year major storm runoff at historic (undeveloped) 5-year flowrates per Weld County Drainage Criteria. Ponds B and C will release peak runoff rates at historical conditions or less per current Town of Erie and MHFD requirements. The facilities proposed will generally conform to the Town of Erie's Outfall System Plan (East of Coal Creek) and will be designed in accordance with current Town of Erie Standards and Specifications and the MHFD Urban Storm Drainage Criteria Manual. The design contained herein in conceptual. Detailed drainage designs will be presented in Phase II and Phase III Drainage Reports.

V. REFERENCES

1. **Urban Storm Drainage Criteria Manual**
   Urban Drainage and Flood Control District, Updated August 2018

2. **Town of Erie Standards and Specifications for Design and Construction of Public Improvements**
   Town of Erie, 2024 Edition

3. **Weld County Engineering and Construction Criteria**
   Weld County, January 2021 Edition

4. **FIRM Map Number 08123C2070E (Not Printed – Zone X)**
   Federal Emergency Management Agency, Effective January 20, 2016.

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

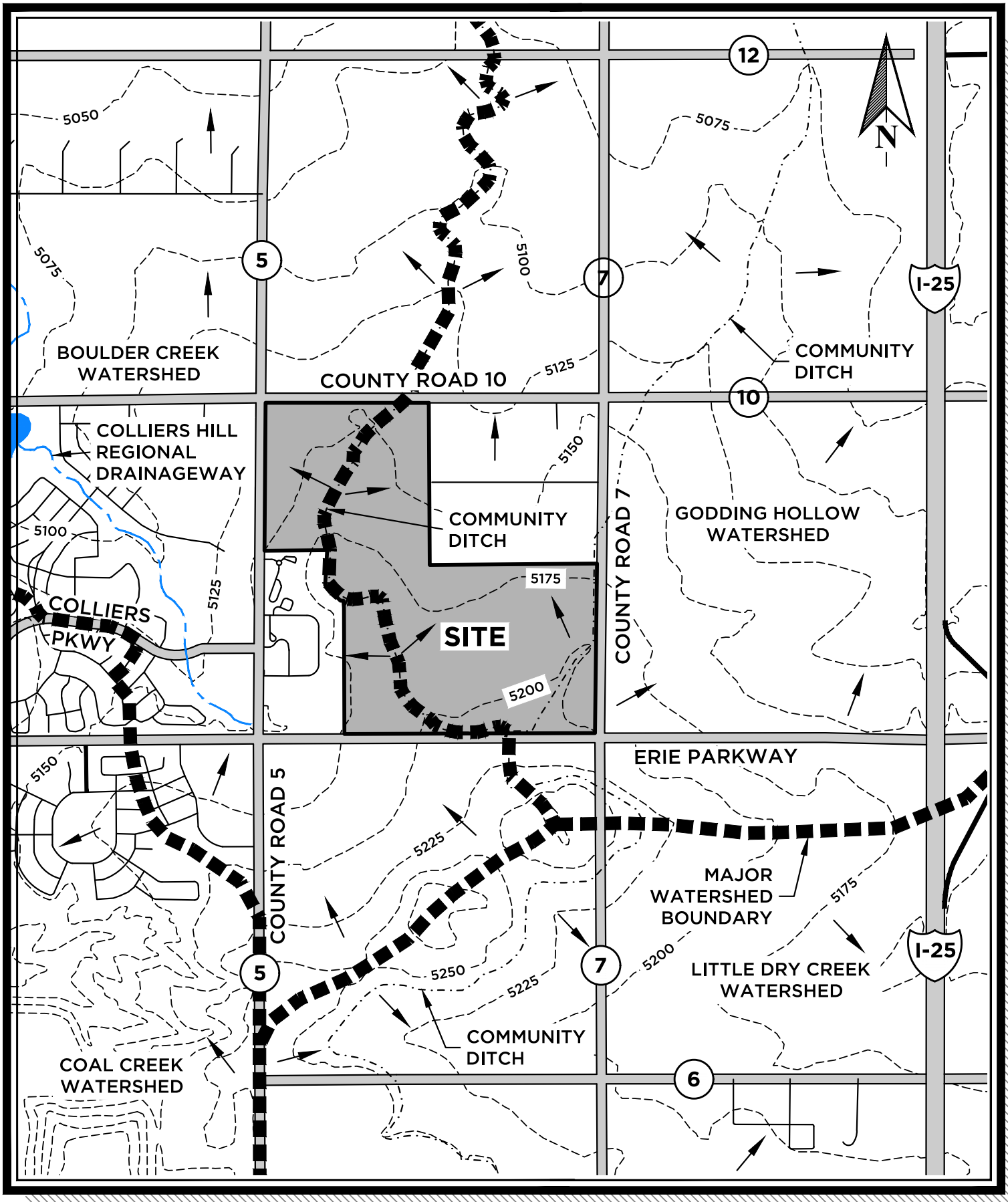
6. **Drainage Letter/Update Report for Erie High School**
   Creative Civil Solutions, April 8, 2014

7. **Phase III Drainage Report for Colliers Hill Filing 4G**
   Hurst and Associates, Inc., Last Revised May 27, 2021

Appendix A

General Location Map

Design Charts & Tables



GENERAL LOCATION MAP

1" = 2000'

3.0 HYDROLOGIC ANALYSIS

3.1 Overview

The baseline hydrology was conducted in accordance with the provisions of the *Town of Erie Standards and Specifications* and the *Urban Storm Drainage Criteria Manual (USDCM)* to generate existing and future peak flows for the East of Coal Creek Outfall Systems Plan. The study area was limited to subbasins east of Coal Creek/Boulder Creek in the Town of Erie. The study area is approximately 28.2 square miles and is located generally between the Weld County Road (WCR) 16 ½ to the north, I-25 to the east, Coal Creek/Boulder Creek to the west, and E Baseline Rd to the south. The Outfall Systems Map on Figure B-5 is a map illustrating the watersheds, outfalls and subbasins within the study area.

CUHP 2005 Version 2.0.0 modeling software was used to generate subbasin hydrographs for the 2-, 5-, 10-, 50-, and 100-year design storms for existing and future land-uses. SWMM 5.1.012 modeling software was used to combine and route individual subbasin hydrographs through the storm drainage system.

The major SWMM model inputs include conduit geometry, Manning's n, junction inverts, and detention facility storage and discharge rating curves. The input parameters for both models were determined from topographic mapping, soils mapping, aerial mapping, future land-use/zoning maps, Town of Erie GIS data, as-built plans, reports, and field investigation.

3.2 Design Rainfall

This hydrology study modeled the two-hour storms for the 2-, 5-, 10-, 50-, and 100-year return periods. To be consistent with the most current UDFCD USDCM, the one-hour rainfall depths for the 2-, 5-, 10-, 50-, and 100-year design storms were determined from the NOAA Atlas 14 Precipitation-Frequency Atlas of the United States and are included in Table 3-1, below. The *Colorado Unit Hydrograph Procedure* (CUHP) 2005 was utilized to create a two-hour rainfall distribution from the one-hour rainfall depths. As the watershed areas being studied are only portions of the total watershed a Depth Reduction Factor was not applied.

Table 3-1 One-Hour Point Rainfall (inches)

Watershed	2-Year	5-Year	10-Year	50-Year	100-Year
Coal Creek	0.82	1.11	1.39	2.23	2.65
Boulder Creek	0.81	1.11	1.39	2.25	2.70
Godding Hollow	0.82	1.11	1.39	2.25	2.69
Little Dry Creek	0.82	1.11	1.39	2.22	2.65

VALUES USED IN CUHP →

3.3 Subbasin Characteristics

The CUHP input parameters are subbasin area, length, centroid distance, slope, percent impervious, depression loss, and infiltration coefficients for Horton's equation. These parameters can be found in Appendix B, Table B-1. Subbasin boundaries were brought into ArcMap 10.0 along with 1-foot contours. Arc Hydro Tools was then used to generate the longest flow length subbasin. These flow lengths were brought into Civil 3D 2018 with the 1-foot contours and checked for accuracy. Many of the subbasins contain roadway crossings and irrigation ditches which caused considerable problems for the commonly used digital tools. The longest flow path for these subbasins had to be edited by hand to implement the assumption that the ditches should be treated as full and therefore do not convey runoff. Centroids were found using Arc Hydro Tools in ArcMap 10.0, and the distance to centroids were determined graphically in Civil 3D 2018 from this information.

3.3.1 Subbasin Delineation

Overall, the study area was divided into 258 subbasins that range in size from 2.6 acres to 683 acres with an average size of 65.9 acres. The 683-acre subbasin is subbasin 217. This subbasin consists of most of the Vista Ridge development. All the runoff from this development was grouped into a single subbasin because it all flows to a detention facility with a single outlet control.

Subbasins were initially delineated using ArcGIS tools based on. Civil 3D 2018 was then used to subdivide the subbasins further to include design points at road and ditch crossings, pond locations and change in conveyance elements. The resulting average subbasin size for this study is 70.1 acres.

The subbasins were initially delineated by Arc Hydro Tools (ArcGIS) using the 2014 LiDAR topographic information provided by the Town of Erie. Adjustments to delineation were made using Civil 3D 2018 to subdivide the subbasins to include design points at road and ditch crossings, pond locations, and changes in conveyance elements. Subbasin delineations were also based on local drainage reports, master drainage plans, and field investigation. The Outfall Systems Map on Figure B-5 shows the watersheds broken into subbasins and highlighted by outfalls. Table 3-2 below provides a summary of each watershed.

Table 3-2 Subbasin Delineation Summary

Watershed	Total Area	Average Subbasin Area	Minimum Subbasin Area	Maximum Subbasin Area	Total No. of Subbasins
	Sq. Mi.	(Acre)	(Acre)	(Acre)	(Unit)
Coal Creek	6.3	56.1	2.6	683.5	72
Boulder Creek	15.2	79.2	4.8	233.8	123
Godding Hollow	4.4	70.6	9.3	189.8	40
Little Dry Creek	2.2	61.6	8.0	132.0	23
Big Dry Creek	0.04	13.5	9.0	18.1	2

The subbasins within the study area were generally delineated so that the maximum subbasins area did not exceed 130 acres and individual subbasin averaged no more than 100 acres (per standard guidance from USDCM). Seventeen of the subbasins exceeded the 130-acre maximum size. In general, these subbasins are very uniform in character and mostly agricultural. More recent versions of CUHP and SWMM have been less sensitive to maximum subbasin size, and these subbasins are very homogenous. Subbasins 217 and 234 were left large for simplicity. They are composites of multiple subbasins in the Vista Ridge development that have a single outlet control regional detention facility.

3.3.2 Watershed Imperviousness

A GIS-based approach was used to determine the land-use and percent imperviousness within each subbasin. The existing percent imperviousness was determined by comparing zoning maps, aerial photography, and existing drainage report values. Future percent imperviousness was determined from drainage reports for future developments, land-use zoning and comprehensive planning maps. Table 2-1 describes the zoning land use categories and corresponding percent imperviousness. The Land Use/ Imperviousness Maps, Figures B-3 and B-4, in Appendix B show the existing and future land use zoning and corresponding imperviousness for the study area. GIS was used to generate weighted area averages of each of land use type was in each subbasin. Composite imperviousness for each subbasin, both existing and future land uses, are shown on the Subbasin Maps Figures B-6 through B-9 in Appendix B. Table B-2 in Appendix B lists the percent impervious for each subbasin in existing and future conditions.

Appendix B
Hydrologic Calculations

CUHP SUBCATCHMENTS

CUHP INPUTS - HISTORIC

Columns with this color heading are for required user-input
Columns with this color heading are for optional override values
Columns with this color heading are for program-calculated values

								Maximum Depression Storage (Watershed inches)		Horton's Infiltration Parameters			DCIA
Subcatchment Name	EPA SWMM Target Node	Raingage	Area (mi^2)	Length to Centroid (mi)	Length (mi)	Slope (ft/ft)	Percent Imperviousness	Pervious	Impervious	Initial Rate (in/hr)	Decay Coefficient (1/seconds)	Final Rate (in/hr)	Level 0, 1, or 2
A	JUNCT_100	100-YR	0.04768	0.10379	0.25414	0.01915	2	0.35	0.1	3	0.0018	0.5	0
B	JUNCT_201	100-YR	0.07689	0.12746	0.37991	0.02366	2	0.35	0.1	3	0.0018	0.5	0
OSB	JUNCT_200	100-YR	0.02111	0.11096	0.21859	0.03108	2	0.35	0.1	3	0.0018	0.5	0
C	JUNCT_300	100-YR	0.07526	0.14371	0.33362	0.02279	2	0.35	0.1	3	0.0018	0.5	0
D	JUNCT_400	100-YR	0.03497	0.06737	0.21554	0.01993	2	0.35	0.1	3	0.0018	0.5	0
E1	JUNCT_500	100-YR	0.12944	0.2367	0.5066	0.01858	2	0.35	0.1	3	0.0018	0.5	0
E2	JUNCT_501	100-YR	0.12611	0.2617	0.52949	0.01699	2	0.35	0.1	3	0.0018	0.5	0
F	JUNCT_503	100-YR	0.13398	0.31804	0.61661	0.01575	2	0.35	0.1	3	0.0018	0.5	0
OS1	JUNCT_505	100-YR	0.16028	0.30602	0.63649	0.01496	2	0.35	0.1	3	0.0018	0.5	0
OS2	JUNCT_507	100-YR	0.09157	0.18906	0.43698	0.01898	2	0.35	0.1	3	0.0018	0.5	0

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

HISTORIC - 2YR

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A		0.158	0.120	27.8	2.86	14.5	2.02	4.8	51	110,770	0.01	1,057	37.0	0	1,057	0.01
B		0.158	0.149	28.5	3.56	14.8	2.52	5.9	81	178,631	0.01	1,704	38.0	1	1,704	0.01
OSB		0.158	0.083	34.3	2.49	17.8	1.76	4.2	18	49,043	0.01	468	39.0	0	468	0.01
C		0.158	0.147	28.9	3.57	15.0	2.52	6.0	78	174,844	0.01	1,668	38.0	1	1,668	0.01
D		0.158	0.104	23.8	2.21	12.4	1.56	3.7	44	81,242	0.01	775	35.0	0	775	0.01
E1		0.158	0.188	37.0	5.64	19.2	3.98	9.4	105	300,715	0.01	2,869	42.0	1	2,869	0.01
E2		0.158	0.186	41.0	6.15	21.3	4.34	10.2	92	292,979	0.01	2,795	43.0	1	2,795	0.01
F		0.158	0.191	48.0	7.33	24.9	5.18	12.2	84	311,262	0.01	2,970	45.0	1	2,970	0.01
OS1		0.158	0.207	44.7	7.40	23.2	5.23	12.3	108	372,362	0.01	3,553	45.0	1	3,553	0.01
OS2		0.158	0.161	35.9	4.74	18.7	3.35	7.9	76	212,735	0.01	2,030	41.0	1	2,030	0.01

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

HISTORIC - 5YR

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A		0.157	0.120	27.8	2.85	14.5	2.02	4.8	51	110,770	0.10	10,623	38.0	4	10,622	0.14
B		0.157	0.148	28.5	3.55	14.8	2.51	5.9	81	178,631	0.10	17,131	38.0	7	17,131	0.14
OSB		0.157	0.083	34.3	2.48	17.8	1.76	4.1	18	49,043	0.10	4,703	38.0	2	4,703	0.12
C		0.157	0.147	28.9	3.56	15.0	2.52	5.9	78	174,844	0.10	16,768	38.0	7	16,768	0.14
D		0.157	0.104	23.8	2.20	12.4	1.55	3.7	44	81,242	0.10	7,791	36.0	4	7,791	0.16
E1		0.157	0.187	37.0	5.62	19.2	3.97	9.4	105	300,715	0.10	28,839	42.0	9	28,839	0.11
E2		0.157	0.185	41.0	6.13	21.3	4.33	10.2	92	292,979	0.10	28,097	43.0	8	28,096	0.10
F		0.157	0.190	48.0	7.31	24.9	5.17	12.2	84	311,262	0.10	29,851	45.0	7	29,850	0.09
OS1		0.157	0.206	44.6	7.38	23.2	5.21	12.3	108	372,362	0.10	35,711	45.0	10	35,710	0.09
OS2		0.157	0.160	35.9	4.73	18.7	3.34	7.9	76	212,735	0.10	20,402	41.0	7	20,402	0.11

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

HISTORIC - 100YR

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A		0.156	0.119	27.8	2.84	14.5	2.01	4.7	51	110,770	1.71	189,465	42.0	57	189,444	1.87
B		0.156	0.147	28.5	3.53	14.8	2.50	5.9	81	178,631	1.71	305,537	42.0	91	305,529	1.85
OSB		0.156	0.082	34.3	2.47	17.8	1.75	4.1	18	49,043	1.71	83,885	44.0	22	83,887	1.60
C		0.156	0.146	28.9	3.54	15.0	2.50	5.9	78	174,844	1.71	299,060	43.0	88	299,062	1.83
D		0.156	0.103	23.8	2.19	12.4	1.55	3.6	44	81,242	1.71	138,960	40.0	47	138,947	2.08
E1		0.156	0.186	37.0	5.59	19.2	3.95	9.3	105	300,715	1.71	514,354	47.0	129	514,357	1.56
E2		0.156	0.184	41.0	6.09	21.3	4.31	10.2	92	292,979	1.71	501,122	49.0	117	501,102	1.45
F		0.156	0.189	47.9	7.27	24.9	5.14	12.1	84	311,262	1.71	532,394	53.0	111	532,374	1.30
OS1		0.156	0.205	44.6	7.33	23.2	5.18	12.2	108	372,362	1.71	636,902	51.0	140	636,893	1.37
OS2		0.156	0.160	35.9	4.70	18.7	3.32	7.8	76	212,735	1.71	363,870	46.0	93	363,863	1.58

CUHP SUBCATCHMENTS

CUHP INPUTS - PROPOSED

Columns with this color heading are for required user-input
Columns with this color heading are for optional override values
Columns with this color heading are for program-calculated values

								Maximum Depression Storage (Watershed inches)		Horton's Infiltration Parameters			DCIA
Subcatchment Name	EPA SWMM Target Node	Raingage	Area (mi^2)	Length to Centroid (mi)	Length (mi)	Slope (ft/ft)	Percent Imperviousness	Pervious	Impervious	Initial Rate (in/hr)	Decay Coefficient (1/seconds)	Final Rate (in/hr)	Level 0, 1, or 2
A	JUNCT_100	2-YR	0.04768	0.10379	0.25414	0.01915	50	0.35	0.1	3	0.0018	0.5	0
B	JUNCT_201	2-YR	0.07689	0.12746	0.37991	0.02366	50	0.35	0.1	3	0.0018	0.5	0
OSB	JUNCT_200	2-YR	0.02111	0.11096	0.21859	0.03108	45	0.35	0.1	3	0.0018	0.5	0
C	JUNCT_300	2-YR	0.07526	0.14371	0.33362	0.02279	65	0.35	0.1	3	0.0018	0.5	0
D	JUNCT_400	2-YR	0.03497	0.06737	0.21554	0.01993	65	0.35	0.1	3	0.0018	0.5	0
E1	JUNCT_500	2-YR	0.12944	0.2367	0.5066	0.01858	65	0.35	0.1	3	0.0018	0.5	0
E2	JUNCT_501	2-YR	0.12611	0.2617	0.52949	0.01699	65	0.35	0.1	3	0.0018	0.5	0
F	JUNCT_503	2-YR	0.13398	0.31804	0.61661	0.01575	50	0.35	0.1	3	0.0018	0.5	0
OS1	JUNCT_505	2-YR	0.16028	0.30602	0.63649	0.01496	21	0.35	0.1	3	0.0018	0.5	0
OS2	JUNCT_507	2-YR	0.09157	0.18906	0.43698	0.01898	21	0.35	0.1	3	0.0018	0.5	0

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

PROPOSED - 2YR

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A		0.089	0.135	14.0	1.75	7.3	1.24	2.9	102	110,770	0.37	41,221	31.0	17	41,195	0.55
B		0.089	0.168	14.4	2.15	7.5	1.52	3.6	161	178,631	0.37	66,475	31.0	27	66,466	0.54
OSB		0.092	0.088	18.8	1.58	9.8	1.11	2.6	34	49,043	0.33	16,208	31.0	5	16,204	0.40
C		0.083	0.187	11.9	2.02	6.2	1.42	3.4	189	174,844	0.50	87,248	31.0	38	87,206	0.79
D		0.083	0.132	9.8	1.30	5.1	0.92	2.2	107	81,242	0.50	40,540	30.0	19	40,559	0.87
E1		0.083	0.239	15.3	3.10	7.9	2.19	5.2	254	300,715	0.50	150,059	32.0	57	150,014	0.69
E2		0.083	0.236	16.9	3.36	8.8	2.38	5.6	224	292,979	0.50	146,198	32.0	52	146,156	0.64
F		0.089	0.215	24.1	4.29	12.6	3.03	7.1	167	311,262	0.37	115,831	35.0	33	115,827	0.38
OS1		0.114	0.161	41.3	5.42	21.5	3.83	9.0	116	372,362	0.13	48,745	42.0	11	48,745	0.11
OS2		0.114	0.125	33.3	3.50	17.3	2.47	5.8	83	212,735	0.13	27,849	38.0	7	27,849	0.12

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

PROPOSED - 5YR

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A		0.089	0.136	13.9	1.75	7.2	1.24	2.9	103	110,770	0.58	64,548	31.0	27	64,511	0.88
B		0.089	0.169	14.2	2.14	7.4	1.51	3.6	162	178,631	0.58	104,091	31.0	42	104,076	0.86
OSB		0.092	0.089	18.6	1.57	9.7	1.11	2.6	34	49,043	0.53	25,972	31.0	9	25,967	0.66
C		0.082	0.187	11.9	2.01	6.2	1.42	3.4	190	174,844	0.74	129,963	31.0	56	129,892	1.17
D		0.082	0.133	9.8	1.30	5.1	0.92	2.2	107	81,242	0.74	60,388	30.0	29	60,412	1.29
E1		0.082	0.239	15.2	3.09	7.9	2.18	5.2	256	300,715	0.74	223,523	32.0	85	223,472	1.02
E2		0.082	0.237	16.8	3.36	8.8	2.37	5.6	225	292,979	0.74	217,773	32.0	77	217,705	0.96
F		0.089	0.216	23.9	4.27	12.4	3.02	7.1	168	311,262	0.58	181,378	35.0	53	181,372	0.62
OS1		0.113	0.161	41.1	5.37	21.4	3.79	8.9	117	372,362	0.28	102,736	42.0	23	102,735	0.22
OS2		0.113	0.125	33.1	3.47	17.2	2.45	5.8	83	212,735	0.28	58,694	38.0	16	58,695	0.27

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.1)

PROPOSED - 100YR

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A		0.089	0.137	13.7	1.74	7.1	1.23	2.9	105	110,770	2.26	250,753	36.0	106	250,627	3.49
B		0.089	0.170	14.0	2.13	7.3	1.51	3.6	165	178,631	2.26	404,371	36.0	170	404,263	3.45
OSB		0.091	0.090	18.3	1.57	9.5	1.11	2.6	35	49,043	2.20	108,135	36.0	39	108,097	2.86
C		0.082	0.188	11.8	2.01	6.1	1.42	3.3	191	174,844	2.44	426,739	35.0	189	426,493	3.93
D		0.082	0.133	9.7	1.29	5.0	0.91	2.2	108	81,242	2.44	198,287	35.0	96	198,363	4.29
E1		0.082	0.240	15.1	3.08	7.8	2.18	5.1	258	300,715	2.44	733,949	37.0	288	733,778	3.48
E2		0.082	0.238	16.7	3.35	8.7	2.36	5.6	227	292,979	2.44	715,068	37.0	264	714,932	3.27
F		0.089	0.219	23.5	4.25	12.2	3.01	7.1	171	311,262	2.26	704,611	41.0	216	704,597	2.52
OS1		0.111	0.160	40.5	5.28	21.1	3.73	8.8	119	372,362	1.92	716,755	48.0	160	716,718	1.56
OS2		0.111	0.124	32.6	3.41	17.0	2.41	5.7	84	212,735	1.92	409,491	44.0	106	409,483	1.80

Weld County Runoff Calculations

Runoff Coefficients

Basin I.D.	Area (acres)	% Imp.	NRCS Soils Group			5-Year			10-Year			100-Year			Runoff Coefficients		
			% A SOILS	% B SOILS	% C/D SOILS	C_A	C_B	$C_{C/D}$	C_A	C_B	$C_{C/D}$	C_A	C_B	$C_{C/D}$	C_5	C_{10}	C_{100}
E	163.6	2%	0.0%	9.7%	90.3%	0.0058	0.0122	0.0514	0.007	0.0732	0.1468	0.1256	0.4354	0.4922	0.05	0.14	0.49
F	85.7	2%	0.0%	0.0%	100.0%	0.0058	0.0122	0.0514	0.007	0.0732	0.1468	0.1256	0.4354	0.4922	0.05	0.15	0.49
A	30.5	2%	0.0%	0.0%	100.0%	0.0058	0.0122	0.0514	0.007	0.0732	0.1468	0.1256	0.4354	0.4922	0.05	0.15	0.49
D	22.4	2%	0.0%	17.9%	82.1%	0.0058	0.0122	0.0514	0.007	0.0732	0.1468	0.1256	0.4354	0.4922	0.04	0.13	0.48

Time of Concentration

Basin I.D.	Area (acres)	% Imp.	C_5	Initial Flow Time			Channelized Flow Time				Tc (min.)
				Length (ft)	Slope (ft/ft)	Ti (min.)	Length (ft)	Slope (ft/ft)	K	Tt (min.)	
E	163.6	2%	0.05	500	0.0274	30.5	3347	0.0125	7	71.3	101.7
F	85.7	2%	0.05	500	0.0202	33.6	2963	0.0143	7	59.0	92.6
A	30.5	2%	0.05	500	0.0242	31.6	858	0.0157	7	16.3	47.9
D	22.4	2%	0.04	500	0.0234	32.2	621	0.0209	7	10.2	42.4

Runoff Rates

$$Intensity = \frac{28.5\ P_1}{(10 + Tc)^{0.786}}$$

Town of Erie One-Hour Rainfall Depths

5-YR P_1 = 1.11

10-YR P_1 = 1.39

100-YR P_1 = 2.68

Basin I.D.	Area (acres)	C_5	C_{10}	C_{100}	Tc (min.)	I_5 (in/hr)	I_{10} (in/hr)	I_{100} (in/hr)	Q_5 (cfs)	Q_{10} (cfs)	Q_{100} (cfs)
E	163.6	0.05	0.14	0.49	101.7	0.78	0.97	1.88	6.0	22.2	149.3
F	85.7	0.05	0.15	0.49	92.6	0.83	1.04	2.01	3.7	13.1	84.6
A	30.5	0.05	0.15	0.49	47.9	1.30	1.63	3.14	2.0	7.3	47.2
D	22.4	0.04	0.13	0.48	42.4	1.41	1.76	3.40	1.4	5.3	36.7

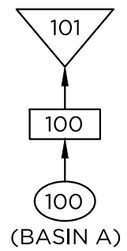
USED TO DETERMINE ALLOWABLE 100-YR RELEASE RATES TO WELD COUNTY

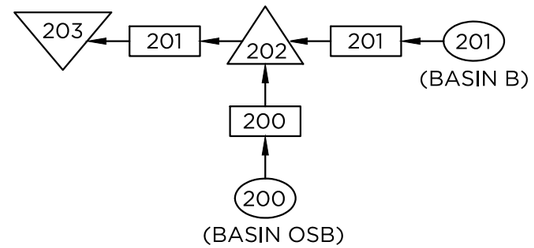
Appendix C
Hydraulic Calculations

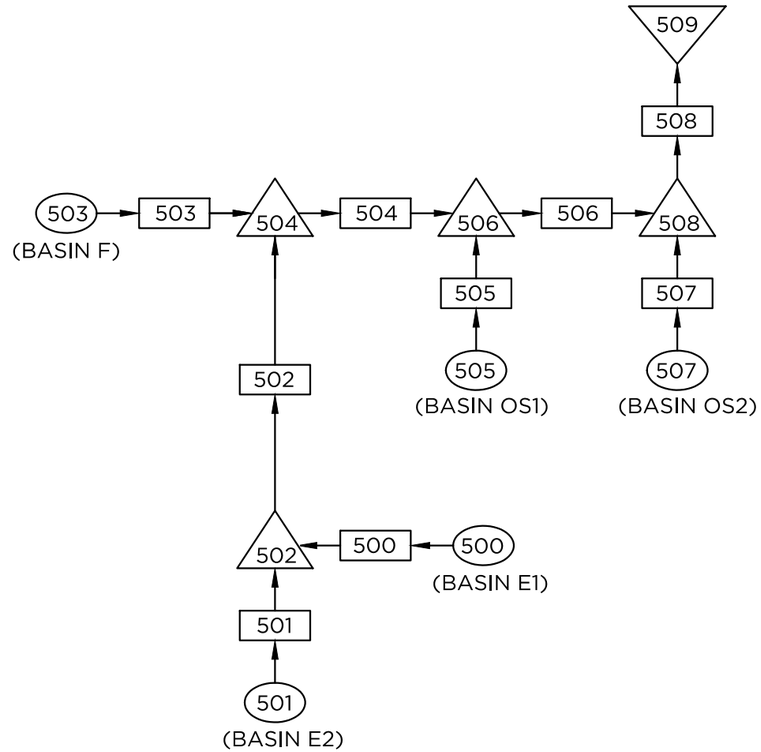
NORTH WESTERLY - SWMM SCHEMATIC
HISTORIC MODEL

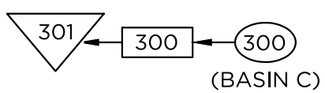
LEGEND

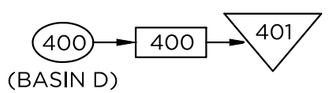
- 501 — DESIGN POINT
- 424 — SUBBASIN
- 1060 — DETENTION FACILITY
- 900 — OUTFALL
- 414 — CONVEYANCE ELEMENT











J:\00992216\CIVIL\DRAINAGE\PHASE II\CAD FILES\2216-P1-SWMM-SCHM.DWG

05.13.2024

KT ENGINEERING
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

HISTORIC SWMM MODEL INPUTS

```
[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         HORTON
FLOW_ROUTING         DYNWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           12/07/2023
START_TIME           00:00:00
REPORT_START_DATE    12/07/2023
REPORT_START_TIME    00:00:00
END_DATE             12/07/2023
END_TIME             12:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:15:00
WET_STEP             00:05:00
DRY_STEP             01:00:00
ROUTING_STEP         0:00:20
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.566
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
```

```
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[FILES]
;;Interfacing Files
USE INFLOWS "J:\0099\2216\CIVIL\DRAINAGE\PHASE I\REPORTS\CUHP\CUHP OUTPUT\HISTORIC\2YR-HISTORIC.txt"

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
CONSTANT         0.0
DRY_ONLY         NO

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded
;;-------------- ---------- ---------- ---------- ---------- ----------
JUNCT_100        5140       0          0          0          0
JUNCT_201        5129.1     0          0          0          0
JUNCT_200        5151       0          0          0          0
JUNCT_300        5166.1     0          0          0          0
JUNCT_400        5188.1     0          0          0          0
JUNCT_500        5165.55    0          0          0          0
JUNCT_501        5161.1     0          0          0          0
JUNCT_502        5161       0          0          0          0
JUNCT_504        5131       0          0          0          0
JUNCT_503        5135.1     0          0          0          0
JUNCT_506        5125       0          0          0          0
JUNCT_507        5123.1     0          0          0          0
JUNCT_508        5123       0          0          0          0
JUNCT_505        5125.1     0          0          0          0
JUNCT_202        5129       0          0          0          0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
```

```
OUTFALL_101      5139.9     FREE                        NO
OUTFALL_301      5166       FREE                        NO
OUTFALL_401      5188       FREE                        NO
OUTFALL_509      5122.9     FREE                        NO
OUTFALL_202      5124       FREE                        NO

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ----------
----------
502              JUNCT_502        JUNCT_504        2420       0.03       0          0          0          0

504              JUNCT_504        JUNCT_506        1200       0.03       0          0          0          0

506              JUNCT_506        JUNCT_508        400        0.03       0          0          0          0

507              JUNCT_507        JUNCT_508        1          0.01       0          0          0          0

400              JUNCT_400        OUTFALL_401      1          0.01       0          0          0          0

300              JUNCT_300        OUTFALL_301      1          0.01       0          0          0          0

100              JUNCT_100        OUTFALL_101      1          0.01       0          0          0          0

500              JUNCT_500        JUNCT_502        650        0.013      0          0          0          0

501              JUNCT_501        JUNCT_502        1          0.01       0          0          0          0

503              JUNCT_503        JUNCT_504        1          0.01       0          0          0          0

508              JUNCT_508        OUTFALL_509      1          0.01       0          0          0          0

505              JUNCT_505        JUNCT_506        1          0.01       0          0          0          0

201              JUNCT_201        JUNCT_202        1          0.01       0          0          0          0
```

```
200              JUNCT_200        JUNCT_202        1          0.01       0          0          0          0

202              JUNCT_202        OUTFALL_202      500        0.03       0          0          0          0


[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---------- ----------
502              TRAPEZOIDAL  5                10         4          4          1
504              TRAPEZOIDAL  5                10         4          4          1
506              TRAPEZOIDAL  5                10         4          4          1
507              DUMMY        0                0          0          0          1
400              DUMMY        0                0          0          0          1
300              DUMMY        0                0          0          0          1
100              DUMMY        0                0          0          0          1
500              CIRCULAR     6                0          0          0          1
501              DUMMY        0                0          0          0          1
503              DUMMY        0                0          0          0          1
508              DUMMY        0                0          0          0          1
505              DUMMY        0                0          0          0          1
201              DUMMY        0                0          0          0          1
200              DUMMY        0                0          0          0          1
202              TRAPEZOIDAL  5                10         10         10         1

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS -677.943 0.000 10000.000 10000.000
Units      None
```

```
[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
JUNCT_100        525.896            7912.351
JUNCT_201        525.896            7434.263
JUNCT_200        422.311            7139.442
JUNCT_300        756.972            6533.865
JUNCT_400        2224.026           6352.814
JUNCT_500        2494.024           6988.048
JUNCT_501        1633.466           6972.112
JUNCT_502        1625.498           7673.307
JUNCT_504        1609.562           8669.323
JUNCT_503        1250.996           7880.478
JUNCT_506        3203.187           8677.291
JUNCT_507        3960.159           8207.171
JUNCT_508        3957.516           8677.291
JUNCT_505        3208.512           8207.171
JUNCT_202        5.325              7402.390
OUTFALL_101      517.928            8509.960
OUTFALL_301      71.713             6127.490
OUTFALL_401      2733.068           6358.566
OUTFALL_509      3965.484           8900.398
OUTFALL_202      -456.827           7418.327

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
```

NORTH WESTERLY - HISTORIC 2-YR
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... NO
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 12/07/2023 00:00:00
Ending Date 12/07/2023 12:00:00
Antecedent Dry Days 0.0
Report Time Step 00:15:00
Routing Time Step ..... 20.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 1
Head Tolerance ..... 0.005000 ft

**********	Volume	Volume
Flow Routing Continuity	acre-feet	10^6 gal
**********	---	---
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000

```
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.457         0.149
External Outflow .........         0.453         0.147
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.004         0.001
Continuity Error (%) .....        -0.014
```

```
**************************
Time-Step Critical Elements
**************************
None
```

```
*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.
```

```
*********************************
Most Frequent Nonconverging Nodes
*********************************
Convergence obtained at all time steps.
```

```
************************
Routing Time Step Summary
************************
Minimum Time Step           :    19.50 sec
Average Time Step           :    19.99 sec
Maximum Time Step           :    20.00 sec
% of Time in Steady State   :     0.00
```

```
Average Iterations per Step :     2.00
% of Steps Not Converging   :     0.00
Time Step Frequencies       :
   20.000 -  9.564 sec      :   100.00 %
    9.564 -  4.573 sec      :     0.00 %
    4.573 -  2.187 sec      :     0.00 %
    2.187 -  1.046 sec      :     0.00 %
    1.046 -  0.500 sec      :     0.00 %


******************
Node Depth Summary
******************
```

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
JUNCT_100	JUNCTION	0.00	0.00	5140.00	0 00:00	0.00
JUNCT_201	JUNCTION	0.00	0.00	5129.10	0 00:00	0.00
JUNCT_200	JUNCTION	0.00	0.00	5151.00	0 00:00	0.00
JUNCT_300	JUNCTION	0.00	0.00	5166.10	0 00:00	0.00
JUNCT_400	JUNCTION	0.00	0.00	5188.10	0 00:00	0.00
JUNCT_500	JUNCTION	0.03	0.25	5165.80	0 00:41	0.25
JUNCT_501	JUNCTION	0.00	0.00	5161.10	0 00:00	0.00
JUNCT_502	JUNCTION	0.02	0.11	5161.11	0 00:57	0.11
JUNCT_504	JUNCTION	0.03	0.14	5131.14	0 01:25	0.14
JUNCT_503	JUNCTION	0.00	0.00	5135.10	0 00:00	0.00
JUNCT_506	JUNCTION	0.08	0.29	5125.29	0 01:39	0.29
JUNCT_507	JUNCTION	0.00	0.00	5123.10	0 00:00	0.00
JUNCT_508	JUNCTION	0.00	0.01	5123.01	0 01:40	0.01
JUNCT_505	JUNCTION	0.00	0.00	5125.10	0 00:00	0.00
JUNCT_202	JUNCTION	0.01	0.10	5129.10	0 00:43	0.10
OUTFALL_101	OUTFALL	0.00	0.00	5139.90	0 00:00	0.00
OUTFALL_301	OUTFALL	0.00	0.00	5166.00	0 00:00	0.00

OUTFALL_401		OUTFALL	0.00	0.00	5188.00	0	00:00	0.00
OUTFALL_509		OUTFALL	0.00	0.00	5122.90	0	00:00	0.00
OUTFALL_202		OUTFALL	0.00	0.05	5124.05	0	00:43	0.05

****
Node Inflow Summary
****

	Node		Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
	JUNCT_100	Basin A	JUNCTION	0.39	0.39	0	00:37	0.0079	0.0079	0.000
	JUNCT_201	Basin B	JUNCTION	0.61	0.61	0	00:38	0.0127	0.0127	0.000
DP2	JUNCT_200	Basin OSB	JUNCTION	0.14	0.14	0	00:39	0.0035	0.0035	0.000
	JUNCT_300	Basin C	JUNCTION	0.60	0.60	0	00:38	0.0125	0.0125	0.000
	JUNCT_400	Basin D	JUNCTION	0.32	0.32	0	00:35	0.0058	0.0058	0.000
DP6	JUNCT_500	Basin E1	JUNCTION	0.85	0.85	0	00:42	0.0215	0.0215	-0.450
	JUNCT_501	Basin E2	JUNCTION	0.76	0.76	0	00:43	0.0209	0.0209	0.000
DP7	JUNCT_502	Basin E1+E2	JUNCTION	0.00	1.62	0	00:43	0	0.0425	0.034
DP9	JUNCT_504		JUNCTION	0.00	1.94	0	01:02	0	0.0647	0.943
DP8	JUNCT_503	Basin F	JUNCTION	0.71	0.71	0	00:45	0.0222	0.0222	0.000
DP10	JUNCT_506		JUNCTION	0.00	1.82	0	01:19	0	0.0906	0.847
	JUNCT_507	Basin OS2	JUNCTION	0.61	0.61	0	00:41	0.0152	0.0152	0.000
DP11	JUNCT_508	WCR 10 Culv.	JUNCTION	0.00	1.77	0	01:34	0	0.105	0.002
	JUNCT_505	Basin OS1	JUNCTION	0.90	0.90	0	00:45	0.0266	0.0266	0.000
DP3	JUNCT_202	Basin OSB+B	JUNCTION	0.00	0.76	0	00:38	0	0.0162	0.009
DP1	OUTFALL_101		OUTFALL	0.00	0.39	0	00:37	0	0.0079	0.000
DP4	OUTFALL_301		OUTFALL	0.00	0.60	0	00:38	0	0.0125	0.000
DP5	OUTFALL_401		OUTFALL	0.00	0.32	0	00:35	0	0.0058	0.000
	OUTFALL_509		OUTFALL	0.00	1.76	0	01:35	0	0.105	0.000
	OUTFALL_202		OUTFALL	0.00	0.72	0	00:43	0	0.0162	0.000

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
JUNCT_100	JUNCTION	12.00	0.000	0.000
JUNCT_201	JUNCTION	12.00	0.000	0.000
JUNCT_200	JUNCTION	12.00	0.000	0.000
JUNCT_300	JUNCTION	12.00	0.000	0.000
JUNCT_400	JUNCTION	12.00	0.000	0.000
JUNCT_501	JUNCTION	12.00	0.000	0.000
JUNCT_503	JUNCTION	12.00	0.000	0.000
JUNCT_507	JUNCTION	12.00	0.000	0.000
JUNCT_505	JUNCTION	12.00	0.000	0.000

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

	Flow Freq	Avg Flow	Max Flow	Total Volume

Outfall Node	Pcnt	CFS	CFS	10^6 gal
OUTFALL_101	20.31	0.12	0.39	0.008
OUTFALL_301	21.70	0.18	0.60	0.012
OUTFALL_401	18.32	0.10	0.32	0.006
OUTFALL_509	97.64	0.33	1.76	0.105
OUTFALL_202	34.10	0.15	0.72	0.016
System	38.42	0.88	2.70	0.147

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
502	CONDUIT	1.38	0	01:02	1.22	0.00	0.02
504	CONDUIT	1.33	0	01:25	0.61	0.00	0.04
506	CONDUIT	1.59	0	01:39	1.00	0.00	0.03
507	DUMMY	0.61	0	00:41			
400	DUMMY	0.32	0	00:35			
300	DUMMY	0.60	0	00:38			
100	DUMMY	0.39	0	00:37			
500	CONDUIT	0.86	0	00:43	4.29	0.00	0.03
501	DUMMY	0.76	0	00:43			
503	DUMMY	0.71	0	00:45			
508	DUMMY	1.76	0	01:35			
505	DUMMY	0.90	0	00:45			
201	DUMMY	0.61	0	00:38			
200	DUMMY	0.14	0	00:39			
202	CONDUIT	0.72	0	00:43	0.90	0.00	0.01

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
502	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.91	0.00
504	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.98	0.00
506	1.00	0.02	0.00	0.00	0.97	0.00	0.00	0.00	0.01	0.00
500	1.00	0.02	0.65	0.00	0.14	0.19	0.00	0.00	0.77	0.00
202	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.08	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Mon May 13 16:17:33 2024
Analysis ended on: Mon May 13 16:17:33 2024
Total elapsed time: < 1 sec

NORTH WESTERLY - HISTORIC 5-YR
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... NO
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 12/07/2023 00:00:00
Ending Date 12/07/2023 12:00:00
Antecedent Dry Days 0.0
Report Time Step 00:15:00
Routing Time Step ..... 20.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 1
Head Tolerance ..... 0.005000 ft

**********	Volume	Volume
Flow Routing Continuity	acre-feet	10^6 gal
**********	---	---
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	4.589	1.495
External Outflow	4.586	1.494

```
Flooding Loss ............          0.000         0.000
Evaporation Loss .........          0.000         0.000
Exfiltration Loss ........          0.000         0.000
Initial Stored Volume ....          0.000         0.000
Final Stored Volume ......          0.005         0.002
Continuity Error (%) .....         -0.021
```

****
Time-Step Critical Elements
****
None

****
Highest Flow Instability Indexes
****
All links are stable.

****
Most Frequent Nonconverging Nodes
****
Convergence obtained at all time steps.

****
Routing Time Step Summary
****

Minimum Time Step	:	6.17 sec
Average Time Step	:	19.98 sec
Maximum Time Step	:	20.00 sec
% of Time in Steady State	:	0.00
Average Iterations per Step	:	2.00
% of Steps Not Converging	:	0.00
Time Step Frequencies	:	
20.000 - 9.564 sec	:	99.95 %
9.564 - 4.573 sec	:	0.05 %
4.573 - 2.187 sec	:	0.00 %

```
    2.187 -  1.046 sec      :     0.00 %
    1.046 -  0.500 sec      :     0.00 %
```

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
JUNCT_100	JUNCTION	0.00	0.00	5140.00	0 00:00	0.00
JUNCT_201	JUNCTION	0.00	0.00	5129.10	0 00:00	0.00
JUNCT_200	JUNCTION	0.00	0.00	5151.00	0 00:00	0.00
JUNCT_300	JUNCTION	0.00	0.00	5166.10	0 00:00	0.00
JUNCT_400	JUNCTION	0.00	0.00	5188.10	0 00:00	0.00
JUNCT_500	JUNCTION	0.08	0.72	5166.27	0 00:39	0.70
JUNCT_501	JUNCTION	0.00	0.00	5161.10	0 00:00	0.00
JUNCT_502	JUNCTION	0.06	0.46	5161.46	0 00:48	0.45
JUNCT_504	JUNCTION	0.10	0.66	5131.66	0 01:01	0.66
JUNCT_503	JUNCTION	0.00	0.00	5135.10	0 00:00	0.00
JUNCT_506	JUNCTION	0.17	0.88	5125.88	0 01:03	0.88
JUNCT_507	JUNCTION	0.00	0.00	5123.10	0 00:00	0.00
JUNCT_508	JUNCTION	0.00	0.04	5123.04	0 01:03	0.04
JUNCT_505	JUNCTION	0.00	0.00	5125.10	0 00:00	0.00
JUNCT_202	JUNCTION	0.03	0.35	5129.35	0 00:40	0.34
OUTFALL_101	OUTFALL	0.00	0.00	5139.90	0 00:00	0.00
OUTFALL_301	OUTFALL	0.00	0.00	5166.00	0 00:00	0.00
OUTFALL_401	OUTFALL	0.00	0.00	5188.00	0 00:00	0.00
OUTFALL_509	OUTFALL	0.00	0.00	5122.90	0 00:00	0.00
OUTFALL_202	OUTFALL	0.02	0.25	5124.25	0 00:40	0.25

****
Node Inflow Summary
****

	Node		Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
	JUNCT_100	Basin A	JUNCTION	4.30	4.30	0	00:38	0.0795	0.0795	0.000
	JUNCT_201	Basin B	JUNCTION	6.81	6.81	0	00:38	0.128	0.128	0.000
DP2	JUNCT_200	Basin OSB	JUNCTION	1.57	1.57	0	00:38	0.0352	0.0352	0.000
	JUNCT_300	Basin C	JUNCTION	6.59	6.59	0	00:38	0.125	0.125	0.000
	JUNCT_400	Basin D	JUNCTION	3.60	3.60	0	00:36	0.0583	0.0583	0.000
DP6	JUNCT_500	Basin E1	JUNCTION	9.19	9.19	0	00:42	0.216	0.216	-0.203
	JUNCT_501	Basin E2	JUNCTION	8.16	8.16	0	00:43	0.21	0.21	0.000
DP7	JUNCT_502	Basin E1+E2	JUNCTION	0.00	17.41	0	00:43	0	0.426	-0.437
DP9	JUNCT_504		JUNCTION	0.00	23.86	0	00:47	0	0.651	0.437
DP8	JUNCT_503	Basin F	JUNCTION	7.49	7.49	0	00:45	0.223	0.223	0.000
DP10	JUNCT_506		JUNCTION	0.00	27.01	0	00:58	0	0.916	0.083
	JUNCT_507	Basin OS2	JUNCTION	6.64	6.64	0	00:41	0.153	0.153	0.000
DP11	JUNCT_508	WCR 10 Culv.	JUNCTION	0.00	30.74	0	01:02	0	1.07	-0.009
	JUNCT_505	Basin OS1	JUNCTION	9.59	9.59	0	00:45	0.267	0.267	0.000
DP3	JUNCT_202	Basin OSB+B	JUNCTION	0.00	8.39	0	00:38	0	0.163	-0.013
DP1	OUTFALL_101		OUTFALL	0.00	4.30	0	00:38	0	0.0795	0.000
DP4	OUTFALL_301		OUTFALL	0.00	6.59	0	00:38	0	0.125	0.000
DP5	OUTFALL_401		OUTFALL	0.00	3.60	0	00:36	0	0.0583	0.000
	OUTFALL_509		OUTFALL	0.00	30.73	0	01:02	0	1.07	0.000
	OUTFALL_202		OUTFALL	0.00	8.33	0	00:40	0	0.163	0.000

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
JUNCT_100	JUNCTION	12.00	0.000	0.000

JUNCT_201	JUNCTION	12.00	0.000	0.000
JUNCT_200	JUNCTION	12.00	0.000	0.000
JUNCT_300	JUNCTION	12.00	0.000	0.000
JUNCT_400	JUNCTION	12.00	0.000	0.000
JUNCT_501	JUNCTION	12.00	0.000	0.000
JUNCT_503	JUNCTION	12.00	0.000	0.000
JUNCT_507	JUNCTION	12.00	0.000	0.000
JUNCT_505	JUNCTION	12.00	0.000	0.000

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OUTFALL_101	23.54	1.04	4.30	0.079
OUTFALL_301	24.65	1.57	6.59	0.125
OUTFALL_401	21.42	0.84	3.60	0.058
OUTFALL_509	97.87	3.37	30.73	1.068
OUTFALL_202	37.42	1.35	8.33	0.163
System	40.98	8.18	44.03	1.494

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
502	CONDUIT	16.45	0	00:48	2.97	0.01	0.11
504	CONDUIT	19.49	0	01:01	1.93	0.02	0.15
506	CONDUIT	26.52	0	01:03	4.82	0.02	0.09
507	DUMMY	6.64	0	00:41			
400	DUMMY	3.60	0	00:36			
300	DUMMY	6.59	0	00:38			
100	DUMMY	4.30	0	00:38			
500	CONDUIT	9.26	0	00:42	7.61	0.03	0.10
501	DUMMY	8.16	0	00:43			
503	DUMMY	7.49	0	00:45			
508	DUMMY	30.73	0	01:02			
505	DUMMY	9.59	0	00:45			
201	DUMMY	6.81	0	00:38			
200	DUMMY	1.57	0	00:38			
202	CONDUIT	8.33	0	00:40	2.13	0.00	0.06

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
502	1.00	0.02	0.01	0.00	0.98	0.00	0.00	0.00	0.94	0.00
504	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.97	0.00
506	1.00	0.02	0.00	0.00	0.77	0.21	0.00	0.00	0.00	0.00
500	1.00	0.02	0.65	0.00	0.13	0.20	0.00	0.00	0.77	0.00
202	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.05	0.00

****

Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Mon May 13 16:13:10 2024
Analysis ended on: Mon May 13 16:13:10 2024
Total elapsed time: < 1 sec

NORTH WESTERLY - HISTORIC 100-YR
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... NO
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 12/07/2023 00:00:00
Ending Date 12/07/2023 12:00:00
Antecedent Dry Days 0.0
Report Time Step 00:15:00
Routing Time Step ..... 20.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 1
Head Tolerance ..... 0.005000 ft

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	81.838	26.668
External Outflow	81.831	26.666

```
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.005         0.002
Continuity Error (%) .....         0.002


**************************
Time-Step Critical Elements
**************************
Link 506 (6.41%)


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


*********************************
Most Frequent Nonconverging Nodes
*********************************
Convergence obtained at all time steps.


************************
Routing Time Step Summary
************************
Minimum Time Step           :     1.82 sec
Average Time Step           :    19.91 sec
Maximum Time Step           :    20.00 sec
% of Time in Steady State   :     0.00
Average Iterations per Step :     2.01
% of Steps Not Converging   :     0.00
Time Step Frequencies       :
   20.000 -  9.564 sec      :    99.95 %
    9.564 -  4.573 sec      :     0.00 %
    4.573 -  2.187 sec      :     0.00 %
```

```
    2.187 -  1.046 sec      :     0.05 %
    1.046 -  0.500 sec      :     0.00 %
```

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
JUNCT_100	JUNCTION	0.00	0.00	5140.00	0 00:00	0.00
JUNCT_201	JUNCTION	0.00	0.00	5129.10	0 00:00	0.00
JUNCT_200	JUNCTION	0.00	0.00	5151.00	0 00:00	0.00
JUNCT_300	JUNCTION	0.00	0.00	5166.10	0 00:00	0.00
JUNCT_400	JUNCTION	0.00	0.00	5188.10	0 00:00	0.00
JUNCT_500	JUNCTION	0.34	2.54	5168.09	0 00:47	2.52
JUNCT_501	JUNCTION	0.00	0.00	5161.10	0 00:00	0.00
JUNCT_502	JUNCTION	0.28	2.00	5163.00	0 00:51	1.96
JUNCT_504	JUNCTION	0.47	2.97	5133.97	0 00:57	2.96
JUNCT_503	JUNCTION	0.00	0.00	5135.10	0 00:00	0.00
JUNCT_506	JUNCTION	0.60	3.43	5128.43	0 00:57	3.42
JUNCT_507	JUNCTION	0.00	0.00	5123.10	0 00:00	0.00
JUNCT_508	JUNCTION	0.06	0.48	5123.48	0 00:57	0.47
JUNCT_505	JUNCTION	0.00	0.00	5125.10	0 00:00	0.00
JUNCT_202	JUNCTION	0.15	1.24	5130.24	0 00:43	1.24
OUTFALL_101	OUTFALL	0.00	0.00	5139.90	0 00:00	0.00
OUTFALL_301	OUTFALL	0.00	0.00	5166.00	0 00:00	0.00
OUTFALL_401	OUTFALL	0.00	0.00	5188.00	0 00:00	0.00
OUTFALL_509	OUTFALL	0.00	0.00	5122.90	0 00:00	0.00
OUTFALL_202	OUTFALL	0.12	1.11	5125.11	0 00:43	1.11

****
Node Inflow Summary
****

	Node		Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
	JUNCT_100	Basin A	JUNCTION	57.20	57.20	0 00:42	1.42	1.42	0.000
	JUNCT_201	Basin B	JUNCTION	91.14	91.14	0 00:42	2.28	2.28	0.000
DP2	JUNCT_200	Basin OSB	JUNCTION	21.68	21.68	0 00:44	0.627	0.627	0.000
	JUNCT_300	Basin C	JUNCTION	88.34	88.34	0 00:43	2.24	2.24	0.000
	JUNCT_400	Basin D	JUNCTION	46.53	46.53	0 00:40	1.04	1.04	0.000
DP6	JUNCT_500	Basin E1	JUNCTION	129.30	129.30	0 00:47	3.85	3.85	-0.042
	JUNCT_501	Basin E2	JUNCTION	117.04	117.04	0 00:49	3.75	3.75	0.000
DP7	JUNCT_502	Basin E1+E2	JUNCTION	0.00	246.19	0 00:48	0	7.6	-0.388
DP9	JUNCT_504		JUNCTION	0.00	355.36	0 00:52	0	11.6	0.281
DP8	JUNCT_503	Basin F	JUNCTION	111.05	111.05	0 00:53	3.98	3.98	0.000
DP10	JUNCT_506		JUNCTION	0.00	485.08	0 00:55	0	16.3	0.006
	JUNCT_507	Basin OS2	JUNCTION	92.73	92.73	0 00:46	2.72	2.72	0.000
DP11	JUNCT_508	WCR 10 Culv.	JUNCTION	0.00	570.81	0 00:56	0	19.1	-0.001
	JUNCT_505	Basin OS1	JUNCTION	140.48	140.48	0 00:51	4.76	4.76	0.000
DP3	JUNCT_202	Basin OSB+B	JUNCTION	0.00	112.79	0 00:43	0	2.91	-0.001
DP1	OUTFALL_101		OUTFALL	0.00	57.20	0 00:42	0	1.42	0.000
DP4	OUTFALL_301		OUTFALL	0.00	88.34	0 00:43	0	2.24	0.000
DP5	OUTFALL_401		OUTFALL	0.00	46.53	0 00:40	0	1.04	0.000
	OUTFALL_509		OUTFALL	0.00	570.77	0 00:56	0	19.1	0.000
	OUTFALL_202		OUTFALL	0.00	112.75	0 00:43	0	2.91	0.000

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
JUNCT_100	JUNCTION	12.00	0.000	0.000

JUNCT_201	JUNCTION	12.00	0.000	0.000
JUNCT_200	JUNCTION	12.00	0.000	0.000
JUNCT_300	JUNCTION	12.00	0.000	0.000
JUNCT_400	JUNCTION	12.00	0.000	0.000
JUNCT_501	JUNCTION	12.00	0.000	0.000
JUNCT_503	JUNCTION	12.00	0.000	0.000
JUNCT_507	JUNCTION	12.00	0.000	0.000
JUNCT_505	JUNCTION	12.00	0.000	0.000

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OUTFALL_101	28.34	15.98	57.20	1.417
OUTFALL_301	29.22	24.47	88.34	2.237
OUTFALL_401	26.27	12.65	46.53	1.039
OUTFALL_509	98.20	61.82	570.77	19.059
OUTFALL_202	42.63	21.84	112.75	2.912
System	44.93	136.76	843.15	26.664

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
502	CONDUIT	244.49	0	00:51	6.02	0.14	0.50
504	CONDUIT	347.63	0	00:57	4.76	0.32	0.64
506	CONDUIT	484.36	0	00:57	13.93	0.45	0.39
507	DUMMY	92.73	0	00:46			
400	DUMMY	46.53	0	00:40			
300	DUMMY	88.34	0	00:43			
100	DUMMY	57.20	0	00:42			
500	CONDUIT	129.35	0	00:47	13.29	0.37	0.38
501	DUMMY	117.04	0	00:49			
503	DUMMY	111.05	0	00:53			
508	DUMMY	570.77	0	00:56			
505	DUMMY	140.48	0	00:51			
201	DUMMY	91.14	0	00:42			
200	DUMMY	21.68	0	00:44			
202	CONDUIT	112.75	0	00:43	4.42	0.04	0.23

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
502	1.00	0.01	0.01	0.00	0.97	0.01	0.00	0.00	0.96	0.00
504	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.97	0.00
506	1.00	0.01	0.00	0.00	0.68	0.30	0.00	0.00	0.01	0.00
500	1.00	0.01	0.64	0.00	0.11	0.24	0.00	0.00	0.77	0.00
202	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.01	0.00

****

Conduit Surcharge Summary
****

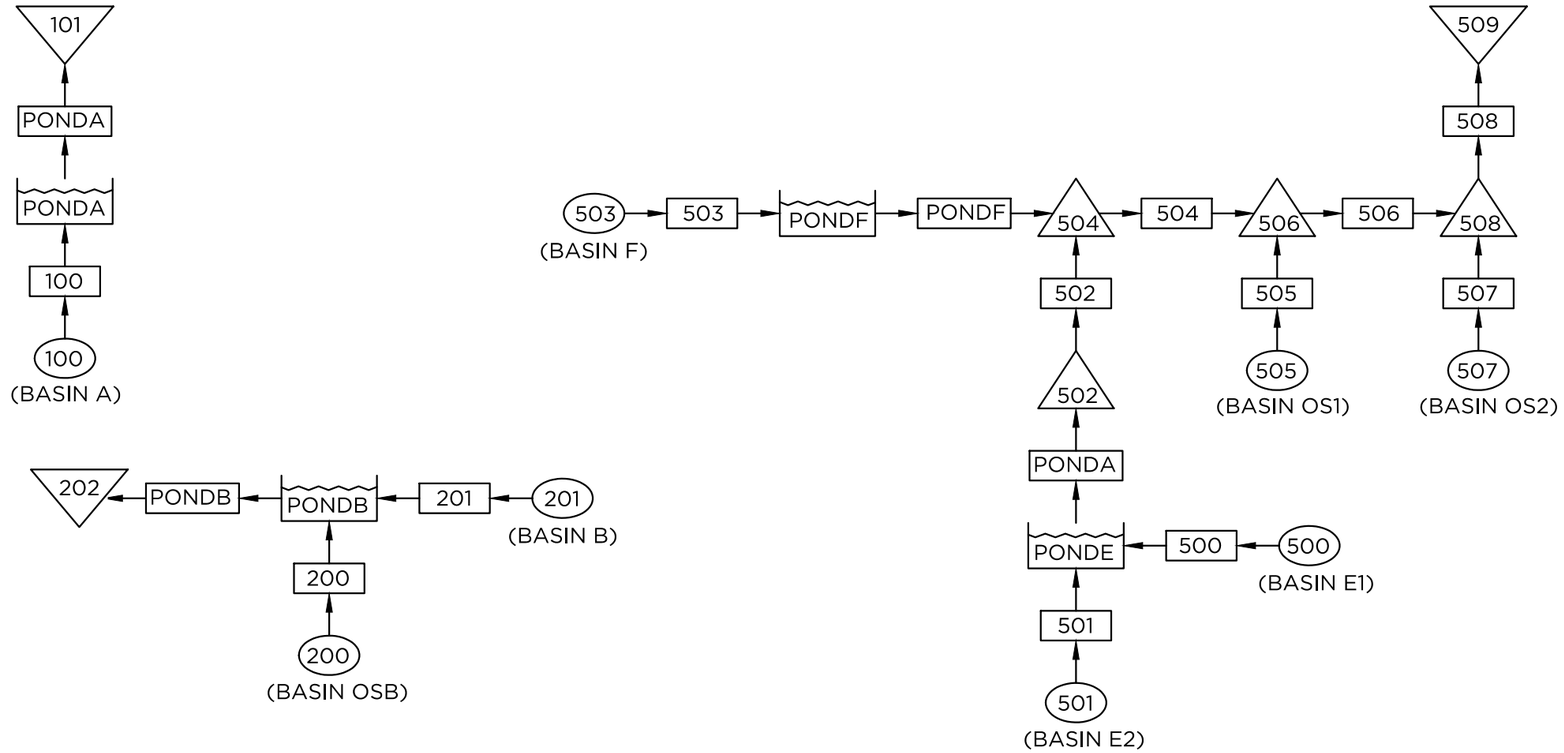
No conduits were surcharged.

Analysis begun on: Mon May 13 16:08:12 2024
Analysis ended on: Mon May 13 16:08:12 2024
Total elapsed time: < 1 sec

NORTH WESTERLY - SWMM SCHEMATIC
PROPOSED MODEL

LEGEND

- 501 — DESIGN POINT
- 424 — SUBBASIN
- 1060 — DETENTION FACILITY
- 900 — OUTFALL
- 414 — CONVEYANCE ELEMENT



KT ENGINEERING
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

05.13.2024

J:\00892216\CIVIL\DRAINAGE\PHASE II\CAD FILES\2216-P1-SWMM-SCHM.DWG

PROPOSED SWMM MODEL INPUTS

```
[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         HORTON
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           12/07/2023
START_TIME           00:00:00
REPORT_START_DATE    12/07/2023
REPORT_START_TIME    00:00:00
END_DATE             12/07/2023
END_TIME             12:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:15:00
WET_STEP             00:05:00
DRY_STEP             01:00:00
ROUTING_STEP         0:00:20
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.566
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
```

```
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[FILES]
;;Interfacing Files
USE INFLOWS "J:\0099\2216\CIVIL\DRAINAGE\PHASE I\REPORTS\CUHP\CUHP OUTPUT\PROPOSED\2-YR.txt"

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
CONSTANT         0.0
DRY_ONLY         NO

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded
;;-------------- ---------- ---------- ---------- ---------- ----------
JUNCT_100        5141.1     0          0          0          0
JUNCT_201        5129.1     0          0          0          0
JUNCT_200        5151       0          0          0          0
JUNCT_300        5163.1     0          0          0          0
JUNCT_400        5189.1     0          0          0          0
JUNCT_500        5165.55    0          0          0          0
JUNCT_501        5162.1     0          0          0          0
JUNCT_502        5161       0          0          0          0
JUNCT_504        5131       0          0          0          0
JUNCT_503        5132.1     0          0          0          0
JUNCT_506        5125       0          0          0          0
JUNCT_507        5123.1     0          0          0          0
JUNCT_508        5123       0          0          0          0
JUNCT_505        5125.1     0          0          0          0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
OUTFALL_101      5139.9     FREE                        NO
```

```
OUTFALL_202      5128.9     FREE                        NO
OUTFALL_301      5162.9     FREE                        NO
OUTFALL_401      5188.9     FREE                        NO
OUTFALL_509      5122.9     FREE                        NO

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Type/Params            SurDepth  Fevap    Psi
 Ksat     IMD
;;-------------- -------- ---------- ---------- ---------- ---------------------------- --------- --------
  -------- --------
STOR_PONDA       5140     8          0          TABULAR    STOR_CURVE_PONDA             0         0
STOR_PONDB       5129     8          0          TABULAR    STOR_CURVE_PONDB             0         0
STOR_PONDC       5163     10         0          TABULAR    STOR_CURVE_PONDC             0         0
STOR_PONDD       5189     8          0          TABULAR    STOR_CURVE_PONDD             0         0
STOR_PONDE       5162     10         0          TABULAR    STOR_CURVE_PONDE             0         0
STOR_PONDF       5132     10         0          TABULAR    STOR_CURVE_PONDF             0         0

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset  InitFlow   MaxFlow

;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ----------
----------
100              JUNCT_100        STOR_PONDA       1          0.01       0          0          0          0

201              JUNCT_201        STOR_PONDB       1          0.01       0          0          0          0

200              JUNCT_200        STOR_PONDB       1          0.01       0          0          0          0

300              JUNCT_300        STOR_PONDC       1          0.01       0          0          0          0

400              JUNCT_400        STOR_PONDD       1          0.01       0          0          0          0

500              JUNCT_500        STOR_PONDE       650        0.013      0          0          0          0

501              JUNCT_501        STOR_PONDE       1          0.01       0          0          0          0
```

```
502              JUNCT_502        JUNCT_504        2420       0.03       0          0          0          0

503              JUNCT_503        STOR_PONDF       1          0.01       0          0          0          0

504              JUNCT_504        JUNCT_506        1200       0.03       0          0          0          0

506              JUNCT_506        JUNCT_508        400        0.03       0          0          0          0

507              JUNCT_507        JUNCT_508        1          0.01       0          0          0          0

508              JUNCT_508        OUTFALL_509      1          0.01       0          0          0          0

505              JUNCT_505        JUNCT_506        1          0.01       0          0          0          0


[OUTLETS]
;;Name           From Node        To Node          Offset     Type            QTable/Qcoeff    Qexpon     Gated
;;-------------- ---------------- ---------------- ---------- --------------- ---------------- ---------- --------
OUTLET_PONDA     STOR_PONDA       OUTFALL_101      0          TABULAR/DEPTH   RATING_CURVE_PONDA            NO

OUTLET_PONDB     STOR_PONDB       OUTFALL_202      0          TABULAR/DEPTH   RATING_CURVE_PONDB            NO

OUTLET_PONDC     STOR_PONDC       OUTFALL_301      0          TABULAR/DEPTH   RATING_CURVE_PONDC            NO

OUTLET_PONDD     STOR_PONDD       OUTFALL_401      0          TABULAR/DEPTH   RATING_CURVE_PONDD            NO

OUTLET_PONDE     STOR_PONDE       JUNCT_502        0          TABULAR/DEPTH   RATING_CURVE_PONDE            NO

OUTLET_PONDF     STOR_PONDF       JUNCT_504        0          TABULAR/DEPTH   RATING_CURVE_PONDF            NO


[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---------- ----------
100              DUMMY        0                0          0          0          1
201              DUMMY        0                0          0          0          1
```

```
200              DUMMY        0               0          0          0          1
300              DUMMY        0               0          0          0          1
400              DUMMY        0               0          0          0          1
500              CIRCULAR     6               0          0          0          1
501              DUMMY        0               0          0          0          1
502              TRAPEZOIDAL  5               10         4          4          1
503              DUMMY        0               0          0          0          1
504              TRAPEZOIDAL  5               10         4          4          1
506              TRAPEZOIDAL  5               10         4          4          1
507              DUMMY        0               0          0          0          1
508              DUMMY        0               0          0          0          1
505              DUMMY        0               0          0          0          1

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
RATING_CURVE_PONDA Rating     0          0
RATING_CURVE_PONDA            1          0.1
RATING_CURVE_PONDA            2          0.24
RATING_CURVE_PONDA            3          0.41
RATING_CURVE_PONDA            4          0.51
RATING_CURVE_PONDA            4.5        0.56
RATING_CURVE_PONDA            5          1.72
RATING_CURVE_PONDA            6          1.88
RATING_CURVE_PONDA            6.5        1.96
RATING_CURVE_PONDA            7          104.49
RATING_CURVE_PONDA            8          552.20
;
RATING_CURVE_PONDB Rating     0          0
RATING_CURVE_PONDB            1          0.19
RATING_CURVE_PONDB            2          0.46
RATING_CURVE_PONDB            3          0.77
RATING_CURVE_PONDB            4          0.97
RATING_CURVE_PONDB            5          55.69
RATING_CURVE_PONDB            6          61.91
RATING_CURVE_PONDB            6.25       63.37
```

```
RATING_CURVE_PONDB            7          247.61
RATING_CURVE_PONDB            8          736.73
;
RATING_CURVE_PONDC Rating     0          0
RATING_CURVE_PONDC            1          0.18
RATING_CURVE_PONDC            2          0.37
RATING_CURVE_PONDC            3          0.52
RATING_CURVE_PONDC            4          0.80
RATING_CURVE_PONDC            4.75       0.93
RATING_CURVE_PONDC            5          5.95
RATING_CURVE_PONDC            6          27.03
RATING_CURVE_PONDC            7          29.32
RATING_CURVE_PONDC            8          31.45
RATING_CURVE_PONDC            9          238.04
RATING_CURVE_PONDC            10         641.17
;
RATING_CURVE_PONDD Rating     0          0
RATING_CURVE_PONDD            1          0.14
RATING_CURVE_PONDD            2          0.31
RATING_CURVE_PONDD            3          0.46
RATING_CURVE_PONDD            3.5        0.51
RATING_CURVE_PONDD            4          1.14
RATING_CURVE_PONDD            5          1.27
RATING_CURVE_PONDD            6          1.38
RATING_CURVE_PONDD            6.25       1.41
RATING_CURVE_PONDD            7          93.85
RATING_CURVE_PONDD            8          353.01
;
RATING_CURVE_PONDE Rating     0          0
RATING_CURVE_PONDE            1          0.47
RATING_CURVE_PONDE            2          0.90
RATING_CURVE_PONDE            3          1.33
RATING_CURVE_PONDE            4          2.11
RATING_CURVE_PONDE            5          2.71
RATING_CURVE_PONDE            5.25       2.83
RATING_CURVE_PONDE            6          4.88
```

```
RATING_CURVE_PONDE            7          5.26
RATING_CURVE_PONDE            8          5.63
RATING_CURVE_PONDE            8.6        5.83
RATING_CURVE_PONDE            9          234.62
RATING_CURVE_PONDE            10         1519.40
;
RATING_CURVE_PONDF Rating     0          0
RATING_CURVE_PONDF            1          0.24
RATING_CURVE_PONDF            2          0.57
RATING_CURVE_PONDF            3          0.95
RATING_CURVE_PONDF            4          1.21
RATING_CURVE_PONDF            5          3.18
RATING_CURVE_PONDF            6          3.48
RATING_CURVE_PONDF            6.75       3.69
RATING_CURVE_PONDF            7          41.55
RATING_CURVE_PONDF            8          440.04
RATING_CURVE_PONDF            9          1089.65
RATING_CURVE_PONDF            10         1944.98
;
STOR_CURVE_PONDA Storage    0          30
STOR_CURVE_PONDA            1          8038
STOR_CURVE_PONDA            2          21341
STOR_CURVE_PONDA            3          37767
STOR_CURVE_PONDA            4          53845
STOR_CURVE_PONDA            5          60129
STOR_CURVE_PONDA            6          66332
STOR_CURVE_PONDA            7          72635
STOR_CURVE_PONDA            8          79038
;
STOR_CURVE_PONDB Storage    0          30
STOR_CURVE_PONDB            1          16131
STOR_CURVE_PONDB            2          49541
STOR_CURVE_PONDB            3          69038
STOR_CURVE_PONDB            4          75024
STOR_CURVE_PONDB            5          80973
STOR_CURVE_PONDB            6          87023
```

```
STOR_CURVE_PONDB            7          93174
STOR_CURVE_PONDB            8          99425
;
STOR_CURVE_PONDC Storage    0          30
STOR_CURVE_PONDC            1          8020
STOR_CURVE_PONDC            2          28156
STOR_CURVE_PONDC            3          43114
STOR_CURVE_PONDC            4          48140
STOR_CURVE_PONDC            5          53266
STOR_CURVE_PONDC            6          58494
STOR_CURVE_PONDC            7          63823
STOR_CURVE_PONDC            8          69253
STOR_CURVE_PONDC            9          75140
STOR_CURVE_PONDC            10         81903
;
STOR_CURVE_PONDD Storage    0          30
STOR_CURVE_PONDD            1          12527
STOR_CURVE_PONDD            2          34938
STOR_CURVE_PONDD            3          43443
STOR_CURVE_PONDD            4          47367
STOR_CURVE_PONDD            5          51397
STOR_CURVE_PONDD            6          55532
STOR_CURVE_PONDD            7          59774
STOR_CURVE_PONDD            8          64122
;
STOR_CURVE_PONDE Storage    0          30
STOR_CURVE_PONDE            1          10404
STOR_CURVE_PONDE            2          42330
STOR_CURVE_PONDE            3          101704
STOR_CURVE_PONDE            4          187065
STOR_CURVE_PONDE            5          249631
STOR_CURVE_PONDE            6          276666
STOR_CURVE_PONDE            7          292899
STOR_CURVE_PONDE            8          304048
STOR_CURVE_PONDE            9          313172
STOR_CURVE_PONDE            10         322396
```

```
;
STOR_CURVE_PONDF Storage    0          30
STOR_CURVE_PONDF            1          12696
STOR_CURVE_PONDF            2          50865
STOR_CURVE_PONDF            3          100624
STOR_CURVE_PONDF            4          146171
STOR_CURVE_PONDF            5          174141
STOR_CURVE_PONDF            6          184737
STOR_CURVE_PONDF            7          191655
STOR_CURVE_PONDF            8          198674
STOR_CURVE_PONDF            9          205793
STOR_CURVE_PONDF            10         213013

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS -591.946 0.000 10000.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
JUNCT_100        525.896            7912.351
JUNCT_201        525.896            7434.263
JUNCT_200        422.311            7139.442
JUNCT_300        756.972            6533.865
JUNCT_400        1960.159           6501.992
JUNCT_500        2494.024           6988.048
JUNCT_501        1633.466           6972.112
JUNCT_502        1625.498           7673.307
```

```
JUNCT_504        1609.562           8669.323
JUNCT_503        1250.996           7880.478
JUNCT_506        3203.187           8677.291
JUNCT_507        3965.996           8219.697
JUNCT_508        3960.159           8661.355
JUNCT_505        3200.047           8214.011
OUTFALL_101      517.928            8509.960
OUTFALL_202      -374.901           7434.263
OUTFALL_301      71.713             6127.490
OUTFALL_401      2733.068           6358.566
OUTFALL_509      3959.761           8908.367
STOR_PONDA       525.896            8223.108
STOR_PONDB       79.681             7434.263
STOR_PONDC       414.343            6310.757
STOR_PONDD       2342.629           6350.598
STOR_PONDE       1625.498           7346.614
STOR_PONDF       1235.060           8270.916

[VERTICES]
;;Link            X-Coord            Y-Coord
;;--------------- ------------------ ------------------
```

NORTH WESTERLY - PROPOSED 2-YR
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... NO
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Flow Routing Method ..... KINWAVE
Starting Date 12/07/2023 00:00:00
Ending Date 12/07/2023 12:00:00
Antecedent Dry Days 0.0
Report Time Step 00:15:00
Routing Time Step ..... 20.00 sec

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	16.993	5.537
External Outflow	6.181	2.014
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000

```
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......        10.821         3.526
Continuity Error (%) .....        -0.058


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    20.00 sec
Average Time Step           :    20.00 sec
Maximum Time Step           :    20.00 sec
% of Time in Steady State   :     0.00
Average Iterations per Step :     1.01
% of Steps Not Converging   :     0.00


******************
Node Depth Summary
******************

--------------------------------------------------------------------------------
                              Average  Maximum  Maximum  Time of Max    Reported
                                Depth    Depth      HGL   Occurrence   Max Depth
Node                 Type        Feet     Feet     Feet  days hr:min        Feet
--------------------------------------------------------------------------------
JUNCT_100            JUNCTION    0.00     0.00  5141.10     0  00:00        0.00
JUNCT_201            JUNCTION    0.00     0.00  5129.10     0  00:00        0.00
JUNCT_200            JUNCTION    0.00     0.00  5151.00     0  00:00        0.00
JUNCT_300            JUNCTION    0.00     0.00  5163.10     0  00:00        0.00
JUNCT_400            JUNCTION    0.00     0.00  5189.10     0  00:00        0.00
```

JUNCT_500		JUNCTION	0.17	1.73	5167.28	0	00:32	1.70
JUNCT_501		JUNCTION	0.00	0.00	5162.10	0	00:00	0.00
JUNCT_502		JUNCTION	0.13	0.14	5161.14	0	02:31	0.14
JUNCT_504		JUNCTION	0.21	0.23	5131.23	0	02:49	0.23
JUNCT_503		JUNCTION	0.00	0.00	5132.10	0	00:00	0.00
JUNCT_506		JUNCTION	0.25	0.47	5125.47	0	00:43	0.47
JUNCT_507		JUNCTION	0.00	0.00	5123.10	0	00:00	0.00
JUNCT_508		JUNCTION	0.25	0.47	5123.47	0	00:45	0.47
JUNCT_505		JUNCTION	0.00	0.00	5125.10	0	00:00	0.00
OUTFALL_101		OUTFALL	0.00	0.00	5139.90	0	00:00	0.00
OUTFALL_202		OUTFALL	0.00	0.00	5128.90	0	00:00	0.00
OUTFALL_301		OUTFALL	0.00	0.00	5162.90	0	00:00	0.00
OUTFALL_401		OUTFALL	0.00	0.00	5188.90	0	00:00	0.00
OUTFALL_509		OUTFALL	0.00	0.00	5122.90	0	00:00	0.00
STOR_PONDA		STORAGE	2.44	2.73	5142.73	0	02:22	2.73
STOR_PONDB		STORAGE	2.38	2.66	5131.66	0	02:26	2.66
STOR_PONDC		STORAGE	3.19	3.56	5166.56	0	02:20	3.56
STOR_PONDD		STORAGE	2.00	2.23	5191.23	0	02:15	2.23
STOR_PONDE		STORAGE	3.80	4.17	5166.17	0	02:31	4.17
STOR_PONDF		STORAGE	2.65	2.95	5134.95	0	02:44	2.95

****
Node Inflow Summary
****

Node		Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
JUNCT_100	Basin A	JUNCTION	16.68	16.68	0	00:31	0.308	0.308	0.000
JUNCT_201	Basin B	JUNCTION	26.57	26.57	0	00:31	0.497	0.497	0.000
DP2 JUNCT_200	Basin OSB	JUNCTION	5.43	5.43	0	00:31	0.121	0.121	0.000
JUNCT_300	Basin C	JUNCTION	37.86	37.86	0	00:31	0.652	0.652	0.000

	JUNCT_400	Basin D	JUNCTION	19.43	19.43	0	00:30	0.303	0.303	0.000
DP6	JUNCT_500	Basin E1	JUNCTION	56.75	56.75	0	00:32	1.12	1.12	0.000
	JUNCT_501	Basin E2	JUNCTION	51.80	51.80	0	00:32	1.09	1.09	0.000
	JUNCT_502	Pond E Outflow	JUNCTION	0.00	2.21	0	02:31	0	0.642	0.000
DP9	JUNCT_504		JUNCTION	0.00	3.14	0	02:49	0	0.887	0.000
	JUNCT_503	Basin F	JUNCTION	32.98	32.98	0	00:35	0.866	0.866	0.000
DP10	JUNCT_506		JUNCTION	0.00	10.84	0	00:43	0	1.23	0.000
	JUNCT_507	Basin OS2	JUNCTION	7.21	7.21	0	00:38	0.208	0.208	0.000
DP11	JUNCT_508	WCR 10 Culv.	JUNCTION	0.00	17.76	0	00:42	0	1.43	0.000
	JUNCT_505	Basin OS1	JUNCTION	10.77	10.77	0	00:42	0.365	0.365	0.000
Pond A Outlet	OUTFALL_101		OUTFALL	0.00	0.36	0	02:22	0	0.103	0.000
Pond B Outlet	OUTFALL_202		OUTFALL	0.00	0.67	0	02:26	0	0.189	0.000
Pond C Outlet	OUTFALL_301		OUTFALL	0.00	0.68	0	02:20	0	0.189	0.000
Pond D Outlet	OUTFALL_401		OUTFALL	0.00	0.34	0	02:15	0	0.0996	0.000
	OUTFALL_509		OUTFALL	0.00	17.76	0	00:42	0	1.43	0.000
DP1	STOR_PONDA		STORAGE	0.00	16.68	0	00:31	0	0.308	-0.001
DP3	STOR_PONDB		STORAGE	0.00	32.00	0	00:31	0	0.618	-0.001
DP4	STOR_PONDC		STORAGE	0.00	37.86	0	00:31	0	0.652	-0.001
DP5	STOR_PONDD		STORAGE	0.00	19.43	0	00:30	0	0.303	-0.001
DP7	STOR_PONDE	Basins E1+E2	STORAGE	0.00	108.34	0	00:33	0	2.21	-0.001
DP8	STOR_PONDF		STORAGE	0.00	32.98	0	00:35	0	0.866	-0.002

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

	Average	Avg	Evap	Exfil	Maximum	Max	Time of Max	Maximum

Storage Unit	Volume 1000 ft³	Pcnt Full	Pcnt Loss	Pcnt Loss	Volume 1000 ft³	Pcnt Full	Occurrence days hr:min	Outflow CFS
STOR_PONDA	31.371	9	0	0	38.791	11	0 02:22	0.36
STOR_PONDB	64.024	12	0	0	78.152	15	0 02:26	0.67
STOR_PONDC	68.393	14	0	0	82.881	17	0 02:20	0.68
STOR_PONDD	31.213	9	0	0	38.375	11	0 02:15	0.34
STOR_PONDE	230.421	12	0	0	279.963	14	0 02:31	2.21
STOR_PONDF	88.183	6	0	0	108.466	8	0 02:44	0.93

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OUTFALL_101	98.10	0.32	0.36	0.103
OUTFALL_202	98.10	0.59	0.67	0.189
OUTFALL_301	98.15	0.60	0.68	0.189
OUTFALL_401	98.10	0.31	0.34	0.100
OUTFALL_509	98.15	4.52	17.76	1.434
System	98.12	6.35	19.16	2.014

****
Link Flow Summary
****

	Maximum |Flow|	Time of Max Occurrence	Maximum |Veloc|	Max/ Full	Max/ Full

Link	Type	CFS	days	hr:min	ft/sec	Flow	Depth
100	DUMMY	16.68	0	00:31			
201	DUMMY	26.57	0	00:31			
200	DUMMY	5.43	0	00:31			
300	DUMMY	37.86	0	00:31			
400	DUMMY	19.43	0	00:30			
500	CONDUIT	56.57	0	00:33	8.42	0.18	0.29
501	DUMMY	51.80	0	00:32			
502	CONDUIT	2.21	0	02:51	1.46	0.00	0.03
503	DUMMY	32.98	0	00:35			
504	CONDUIT	3.14	0	03:00	1.24	0.00	0.05
506	CONDUIT	10.82	0	00:45	1.93	0.01	0.09
507	DUMMY	7.21	0	00:38			
508	DUMMY	17.76	0	00:42			
505	DUMMY	10.77	0	00:42			
OUTLET_PONDA	DUMMY	0.36	0	02:22			
OUTLET_PONDB	DUMMY	0.67	0	02:26			
OUTLET_PONDC	DUMMY	0.68	0	02:20			
OUTLET_PONDD	DUMMY	0.34	0	02:15			
OUTLET_PONDE	DUMMY	2.21	0	02:31			
OUTLET_PONDF	DUMMY	0.93	0	02:44			

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Thu Jan 30 17:25:32 2025
Analysis ended on: Thu Jan 30 17:25:32 2025
Total elapsed time: < 1 sec

NORTH WESTERLY - PROPOSED 5-YR
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... NO
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Flow Routing Method ..... KINWAVE
Starting Date 12/07/2023 00:00:00
Ending Date 12/07/2023 12:00:00
Antecedent Dry Days 0.0
Report Time Step 00:15:00
Routing Time Step ..... 20.00 sec

********** Flow Routing Continuity **********	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	26.832	8.744
External Outflow	9.180	2.991
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	17.659	5.755
Continuity Error (%)	-0.028	

```
*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    20.00 sec
Average Time Step           :    20.00 sec
Maximum Time Step           :    20.00 sec
% of Time in Steady State   :     0.00
Average Iterations per Step :     1.01
% of Steps Not Converging   :     0.00


******************
Node Depth Summary
******************
```

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
JUNCT_100	JUNCTION	0.00	0.00	5141.10	0 00:00	0.00
JUNCT_201	JUNCTION	0.00	0.00	5129.10	0 00:00	0.00
JUNCT_200	JUNCTION	0.00	0.00	5151.00	0 00:00	0.00
JUNCT_300	JUNCTION	0.00	0.00	5163.10	0 00:00	0.00
JUNCT_400	JUNCTION	0.00	0.00	5189.10	0 00:00	0.00
JUNCT_500	JUNCTION	0.21	2.13	5167.68	0 00:32	2.08
JUNCT_501	JUNCTION	0.00	0.00	5162.10	0 00:00	0.00
JUNCT_502	JUNCTION	0.15	0.16	5161.16	0 02:32	0.16
JUNCT_504	JUNCTION	0.23	0.25	5131.25	0 02:51	0.25
JUNCT_503	JUNCTION	0.00	0.00	5132.10	0 00:00	0.00
JUNCT_506	JUNCTION	0.30	0.73	5125.73	0 00:42	0.73

JUNCT_507	JUNCTION	0.00	0.00	5123.10	0	00:00	0.00
JUNCT_508	JUNCTION	0.30	0.73	5123.73	0	00:44	0.73
JUNCT_505	JUNCTION	0.00	0.00	5125.10	0	00:00	0.00
OUTFALL_101	OUTFALL	0.00	0.00	5139.90	0	00:00	0.00
OUTFALL_202	OUTFALL	0.00	0.00	5128.90	0	00:00	0.00
OUTFALL_301	OUTFALL	0.00	0.00	5162.90	0	00:00	0.00
OUTFALL_401	OUTFALL	0.00	0.00	5188.90	0	00:00	0.00
OUTFALL_509	OUTFALL	0.00	0.00	5122.90	0	00:00	0.00
STOR_PONDA	STORAGE	3.01	3.33	5143.33	0	02:24	3.33
STOR_PONDB	STORAGE	3.01	3.34	5132.34	0	02:27	3.34
STOR_PONDC	STORAGE	3.96	4.42	5167.42	0	02:21	4.42
STOR_PONDD	STORAGE	2.45	2.73	5191.73	0	02:17	2.73
STOR_PONDE	STORAGE	4.43	4.82	5166.82	0	02:32	4.82
STOR_PONDF	STORAGE	3.21	3.52	5135.52	0	02:46	3.52

****
Node Inflow Summary
****

	Node		Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
	JUNCT_100	Basin A	JUNCTION	26.71	26.71	0	00:31	0.483	0.483	0.000
	JUNCT_201	Basin B	JUNCTION	42.43	42.43	0	00:31	0.778	0.778	0.000
DP2	JUNCT_200	Basin OSB	JUNCTION	8.96	8.96	0	00:31	0.194	0.194	0.000
	JUNCT_300	Basin C	JUNCTION	56.43	56.43	0	00:31	0.972	0.972	0.000
	JUNCT_400	Basin D	JUNCTION	28.88	28.88	0	00:30	0.452	0.452	0.000
DP6	JUNCT_500	Basin E1	JUNCTION	84.74	84.74	0	00:32	1.67	1.67	0.000
	JUNCT_501	Basin E2	JUNCTION	77.37	77.37	0	00:32	1.63	1.63	0.000
	JUNCT_502	Pond E Outflow	JUNCTION	0.00	2.60	0	02:32	0	0.766	0.000
DP9	JUNCT_504		JUNCTION	0.00	3.68	0	02:51	0	1.06	0.000
	JUNCT_503	Basin F	JUNCTION	52.81	52.81	0	00:35	1.36	1.36	0.000
DP10	JUNCT_506		JUNCTION	0.00	23.16	0	00:42	0	1.81	0.000
	JUNCT_507	Basin OS2	JUNCTION	15.57	15.57	0	00:38	0.439	0.439	0.000
DP11	JUNCT_508	WCR 10 Culv.	JUNCTION	0.00	38.16	0	00:42	0	2.24	0.000

	JUNCT_505 Basin OS1	JUNCTION	23.05	23.05	0	00:42	0.768	0.768	0.000
Pond A Outlet	OUTFALL_101	OUTFALL	0.00	0.44	0	02:24	0	0.131	0.000
Pond B Outlet	OUTFALL_202	OUTFALL	0.00	0.84	0	02:27	0	0.246	0.000
Pond C Outlet	OUTFALL_301	OUTFALL	0.00	0.87	0	02:21	0	0.253	0.000
Pond D Outlet	OUTFALL_401	OUTFALL	0.00	0.42	0	02:17	0	0.122	0.000
	OUTFALL_509	OUTFALL	0.00	38.16	0	00:42	0	2.24	0.000
DP1	STOR_PONDA	STORAGE	0.00	26.71	0	00:31	0	0.483	-0.001
DP3	STOR_PONDB	STORAGE	0.00	51.40	0	00:31	0	0.973	-0.001
DP4	STOR_PONDC	STORAGE	0.00	56.43	0	00:31	0	0.972	-0.001
DP5	STOR_PONDD	STORAGE	0.00	28.88	0	00:30	0	0.452	-0.001
DP7	STOR_PONDE Basins E1+E2	STORAGE	0.00	161.72	0	00:33	0	3.3	-0.001
DP8	STOR_PONDF	STORAGE	0.00	52.81	0	00:35	0	1.36	-0.001

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft³	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
STOR_PONDA	51.313	14	0	0	61.454	17	0 02:24	0.44
STOR_PONDB	104.387	20	0	0	124.173	24	0 02:27	0.84
STOR_PONDC	104.102	21	0	0	124.179	25	0 02:21	0.87
STOR_PONDD	48.300	14	0	0	57.711	17	0 02:17	0.42
STOR_PONDE	356.272	18	0	0	421.536	22	0 02:32	2.60
STOR_PONDF	144.729	11	0	0	172.435	13	0 02:46	1.09

****

Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OUTFALL_101	98.33	0.41	0.44	0.131
OUTFALL_202	98.38	0.77	0.84	0.246
OUTFALL_301	98.38	0.80	0.87	0.253
OUTFALL_401	98.38	0.38	0.42	0.122
OUTFALL_509	98.38	7.05	38.16	2.240
System	98.37	9.41	39.88	2.991

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
100	DUMMY	26.71	0 00:31			
201	DUMMY	42.43	0 00:31			
200	DUMMY	8.96	0 00:31			
300	DUMMY	56.43	0 00:31			
400	DUMMY	28.88	0 00:30			
500	CONDUIT	84.41	0 00:33	9.42	0.27	0.35
501	DUMMY	77.37	0 00:32			
502	CONDUIT	2.60	0 02:52	1.55	0.00	0.03
503	DUMMY	52.81	0 00:35			
504	CONDUIT	3.68	0 03:01	1.32	0.00	0.05
506	CONDUIT	23.13	0 00:44	2.46	0.02	0.15
507	DUMMY	15.57	0 00:38			
508	DUMMY	38.16	0 00:42			

505	DUMMY	23.05	0	00:42
OUTLET_PONDA	DUMMY	0.44	0	02:24
OUTLET_PONDB	DUMMY	0.84	0	02:27
OUTLET_PONDC	DUMMY	0.87	0	02:21
OUTLET_PONDD	DUMMY	0.42	0	02:17
OUTLET_PONDE	DUMMY	2.60	0	02:32
OUTLET_PONDF	DUMMY	1.09	0	02:46

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Thu Jan 30 16:24:07 2025
Analysis ended on: Thu Jan 30 16:24:07 2025
Total elapsed time: < 1 sec

NORTH WESTERLY - PROPOSED 100-YR
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... NO
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Flow Routing Method ..... KINWAVE
Starting Date 12/07/2023 00:00:00
Ending Date 12/07/2023 12:00:00
Antecedent Dry Days 0.0
Report Time Step 00:15:00
Routing Time Step ..... 20.00 sec

********** Flow Routing Continuity **********	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	107.144	34.914
External Outflow	52.533	17.119
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	54.592	17.789
Continuity Error (%)	0.018	

```
*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    20.00 sec
Average Time Step           :    20.00 sec
Maximum Time Step           :    20.00 sec
% of Time in Steady State   :     0.00
Average Iterations per Step :     1.02
% of Steps Not Converging   :     0.00


******************
Node Depth Summary
******************
```

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
JUNCT_100	JUNCTION	0.00	0.00	5141.10	0 00:00	0.00
JUNCT_201	JUNCTION	0.00	0.00	5129.10	0 00:00	0.00
JUNCT_200	JUNCTION	0.00	0.00	5151.00	0 00:00	0.00
JUNCT_300	JUNCTION	0.00	0.00	5163.10	0 00:00	0.00
JUNCT_400	JUNCTION	0.00	0.00	5189.10	0 00:00	0.00
JUNCT_500	JUNCTION	0.38	4.54	5170.09	0 00:37	4.07
JUNCT_501	JUNCTION	0.00	0.00	5162.10	0 00:00	0.00
JUNCT_502	JUNCTION	0.24	0.25	5161.25	0 02:31	0.25
JUNCT_504	JUNCTION	0.40	0.44	5131.44	0 02:42	0.44
JUNCT_503	JUNCTION	0.00	0.00	5132.10	0 00:00	0.00
JUNCT_506	JUNCTION	0.63	2.04	5127.04	0 00:48	2.02

JUNCT_507	JUNCTION	0.00	0.00	5123.10	0	00:00	0.00
JUNCT_508	JUNCTION	0.62	2.04	5125.04	0	00:49	2.01
JUNCT_505	JUNCTION	0.00	0.00	5125.10	0	00:00	0.00
OUTFALL_101	OUTFALL	0.00	0.00	5139.90	0	00:00	0.00
OUTFALL_202	OUTFALL	0.00	0.00	5128.90	0	00:00	0.00
OUTFALL_301	OUTFALL	0.00	0.00	5162.90	0	00:00	0.00
OUTFALL_401	OUTFALL	0.00	0.00	5188.90	0	00:00	0.00
OUTFALL_509	OUTFALL	0.00	0.00	5122.90	0	00:00	0.00
STOR_PONDA	STORAGE	5.63	6.37	5146.37	0	02:15	6.37
STOR_PONDB	STORAGE	3.90	5.92	5134.92	0	01:16	5.91
STOR_PONDC	STORAGE	4.91	7.64	5170.64	0	01:20	7.61
STOR_PONDD	STORAGE	4.86	5.50	5194.50	0	02:14	5.50
STOR_PONDE	STORAGE	7.59	8.31	5170.31	0	02:31	8.31
STOR_PONDF	STORAGE	5.88	6.54	5138.54	0	02:36	6.54

****
Node Inflow Summary
****

	Node		Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
	JUNCT_100	Basin A	JUNCTION	106.40	106.40	0	00:36	1.87	1.87	0.000
	JUNCT_201	Basin B	JUNCTION	169.95	169.95	0	00:36	3.02	3.02	0.000
DP2	JUNCT_200	Basin OSB	JUNCTION	38.62	38.62	0	00:36	0.809	0.809	0.000
	JUNCT_300	Basin C	JUNCTION	189.50	189.50	0	00:35	3.19	3.19	0.000
	JUNCT_400	Basin D	JUNCTION	96.03	96.03	0	00:35	1.48	1.48	0.000
DP6	JUNCT_500	Basin E1	JUNCTION	287.89	287.89	0	00:37	5.49	5.49	0.000
	JUNCT_501	Basin E2	JUNCTION	264.14	264.14	0	00:37	5.35	5.35	0.000
	JUNCT_502	Pond E Outflow	JUNCTION	0.00	5.73	0	02:31	0	1.72	0.000
DP9	JUNCT_504		JUNCTION	0.00	9.36	0	02:42	0	2.74	0.000
	JUNCT_503	Basin F	JUNCTION	216.06	216.06	0	00:41	5.27	5.27	0.000
DP10	JUNCT_506		JUNCTION	0.00	161.13	0	00:48	0	8.06	0.000
	JUNCT_507	Basin OS2	JUNCTION	105.76	105.76	0	00:44	3.06	3.06	0.000
DP11	JUNCT_508	WCR 10 Culv.	JUNCTION	0.00	264.94	0	00:48	0	11.1	0.000

	JUNCT_505	Basin OS1	JUNCTION	160.42	160.42	0	00:48	5.36	5.36	0.000
Pond A Outlet	OUTFALL_101		OUTFALL	0.00	1.94	0	02:15	0	0.566	0.000
Pond B Outlet	OUTFALL_202		OUTFALL	0.00	61.38	0	01:16	0	2.75	0.000
Pond C Outlet	OUTFALL_301		OUTFALL	0.00	30.68	0	01:20	0	2.3	0.000
Pond D Outlet	OUTFALL_401		OUTFALL	0.00	1.33	0	02:14	0	0.392	0.000
	OUTFALL_509		OUTFALL	0.00	264.94	0	00:48	0	11.1	0.000
DP1	STOR_PONDA		STORAGE	0.00	106.40	0	00:36	0	1.87	0.000
DP3	STOR_PONDB		STORAGE	0.00	208.57	0	00:36	0	3.83	0.092
DP4	STOR_PONDC		STORAGE	0.00	189.50	0	00:35	0	3.19	0.066
DP5	STOR_PONDD		STORAGE	0.00	96.03	0	00:35	0	1.48	0.000
DP7	STOR_PONDE	Basins E1+E2	STORAGE	0.00	551.42	0	00:37	0	10.8	0.000
DP8	STOR_PONDF		STORAGE	0.00	216.06	0	00:41	0	5.27	-0.000

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft³	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
STOR_PONDA	196.471	55	0	0	239.002	66	0 02:15	1.94
STOR_PONDB	169.060	32	0	0	326.898	63	0 01:16	61.38
STOR_PONDC	154.508	32	0	0	312.857	64	0 01:20	30.68
STOR_PONDD	159.866	47	0	0	190.346	56	0 02:14	1.33
STOR_PONDE	1225.881	63	0	0	1406.489	73	0 02:31	5.73
STOR_PONDF	575.704	42	0	0	678.004	49	0 02:36	3.63

****

Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OUTFALL_101	98.66	1.78	1.94	0.566
OUTFALL_202	98.70	8.63	61.38	2.752
OUTFALL_301	98.70	7.20	30.68	2.298
OUTFALL_401	98.70	1.23	1.33	0.392
OUTFALL_509	98.70	34.84	264.94	11.110
System	98.69	53.67	350.55	17.117

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
100	DUMMY	106.40	0	00:36			
201	DUMMY	169.95	0	00:36			
200	DUMMY	38.62	0	00:36			
300	DUMMY	189.50	0	00:35			
400	DUMMY	96.03	0	00:35			
500	CONDUIT	287.42	0	00:37	12.59	0.92	0.76
501	DUMMY	264.14	0	00:37			
502	CONDUIT	5.73	0	02:45	2.07	0.00	0.05
503	DUMMY	216.06	0	00:41			
504	CONDUIT	9.36	0	02:50	1.83	0.01	0.09
506	CONDUIT	161.06	0	00:49	4.35	0.15	0.41
507	DUMMY	105.76	0	00:44			
508	DUMMY	264.94	0	00:48			

505	DUMMY	160.42	0	00:48
OUTLET_PONDA	DUMMY	1.94	0	02:15
OUTLET_PONDB	DUMMY	61.38	0	01:16
OUTLET_PONDC	DUMMY	30.68	0	01:20
OUTLET_PONDD	DUMMY	1.33	0	02:14
OUTLET_PONDE	DUMMY	5.73	0	02:31
OUTLET_PONDF	DUMMY	3.63	0	02:36

****
Conduit Surcharge Summary
****

No conduits were surcharged.

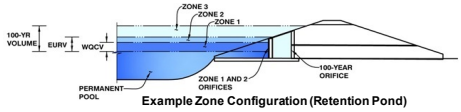
Analysis begun on: Thu Jan 30 17:21:37 2025
Analysis ended on: Thu Jan 30 17:21:37 2025
Total elapsed time: < 1 sec

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: NORTH WESTERLY

Basin ID: POND A



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	30.50	acres
Watershed Length =	1,342	ft
Watershed Length to Centroid =	548	ft
Watershed Slope =	0.019	ft/ft
Watershed Imperviousness =	50.00%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	Erie	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides
Water Quality Capture Volume (WQCV) =	0.524	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	1.443	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 0.81 in.) =	0.906	acre-feet	inches
5-yr Runoff Volume (P1 = 1.11 in.) =	1.432	acre-feet	inches
10-yr Runoff Volume (P1 = 1.39 in.) =	2.063	acre-feet	inches
25-yr Runoff Volume (P1 = 1.84 in.) =	3.287	acre-feet	inches
50-yr Runoff Volume (P1 = 2.24 in.) =	4.316	acre-feet	inches
100-yr Runoff Volume (P1 = 2.68 in.) =	5.549	acre-feet	inches
500-yr Runoff Volume (P1 = 3.89 in.) =	8.762	acre-feet	inches
Approximate 2-yr Detention Volume =	0.869	acre-feet	
Approximate 5-yr Detention Volume =	1.404	acre-feet	
Approximate 10-yr Detention Volume =	1.718	acre-feet	
Approximate 25-yr Detention Volume =	2.153	acre-feet	
Approximate 50-yr Detention Volume =	2.414	acre-feet	
Approximate 100-yr Detention Volume =	2.934	acre-feet	

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.524	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.919	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	1.491	acre-feet
Total Detention Basin Volume =	2.934	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

Depth Increment = ft

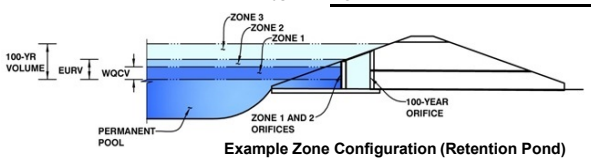
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	30	0.001		
5141	--	1.00	--	--	--	8,038	0.185	4,034	0.093
5142	--	2.00	--	--	--	21,341	0.490	18,723	0.430
5143	--	3.00	--	--	--	37,767	0.867	48,277	1.108
5144	--	4.00	--	--	--	53,845	1.236	94,083	2.160
5145	--	5.00	--	--	--	60,129	1.380	151,070	3.468
5146	--	6.00	--	--	--	66,332	1.523	214,301	4.920
5147	--	7.00	--	--	--	72,635	1.667	283,784	6.515
5148	--	8.00	--	--	--	79,038	1.814	359,621	8.256

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: NORTH WESTERLY

Basin ID: POND A



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.19	0.524	Orifice Plate
Zone 2 (EURV)	3.36	0.919	Orifice Plate
Zone 3 (100-year)	4.61	1.491	Weir&Pipe (Restrict)
Total (all zones)		2.934	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	2.125E-02	ft^2
Depth at top of Zone using Orifice Plate =	3.36	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	13.40	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	3.06	sq. inches (diameter = 1-15/16 inches)	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.12	2.24					
Orifice Area (sq. inches)	3.06	3.06	3.06					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected			Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A	N/A	feet
Vertical Orifice Diameter =	N/A	N/A	inches				

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Zone 3 Weir	Not Selected			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	4.50	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	4.50	N/A	feet
Overflow Weir Front Edge Length =	8.00	N/A	feet	Overflow Weir Slope Length =	4.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	160.85	N/A	
Horiz. Length of Weir Sides =	4.00	N/A	feet	Overflow Grate Open Area w/o Debris =	25.31	N/A	ft^2
Overflow Grate Type =	Close Mesh Grate	N/A		Overflow Grate Open Area w/ Debris =	12.66	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.30	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	0.16	N/A	ft^2
Outlet Pipe Diameter =	18.00	N/A	inches	Outlet Orifice Centroid =	0.13	N/A	feet
Restrictor Plate Height Above Pipe Invert =	2.60		inches	Half-Central Angle of Restrictor Plate on Pipe =	0.78	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	6.50	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.50	feet
Spillway Crest Length =	95.00	feet	Stage at Top of Freeboard =	8.00	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	1.81	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	8.26	acre-ft

Calculated Parameters for Spillway

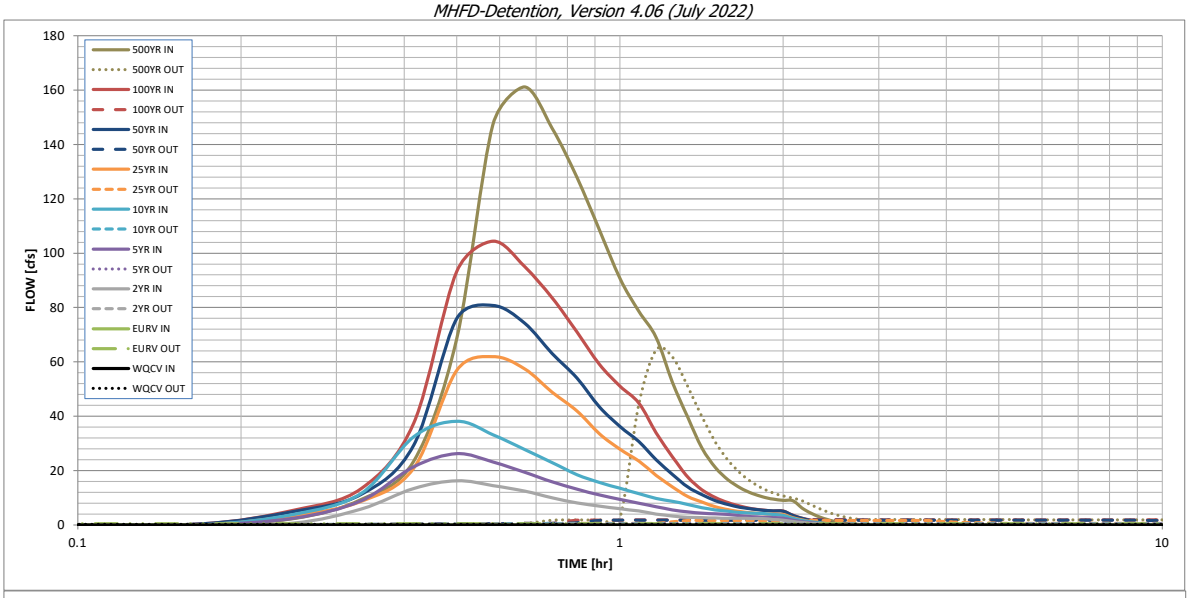
Routed Hydrograph Results

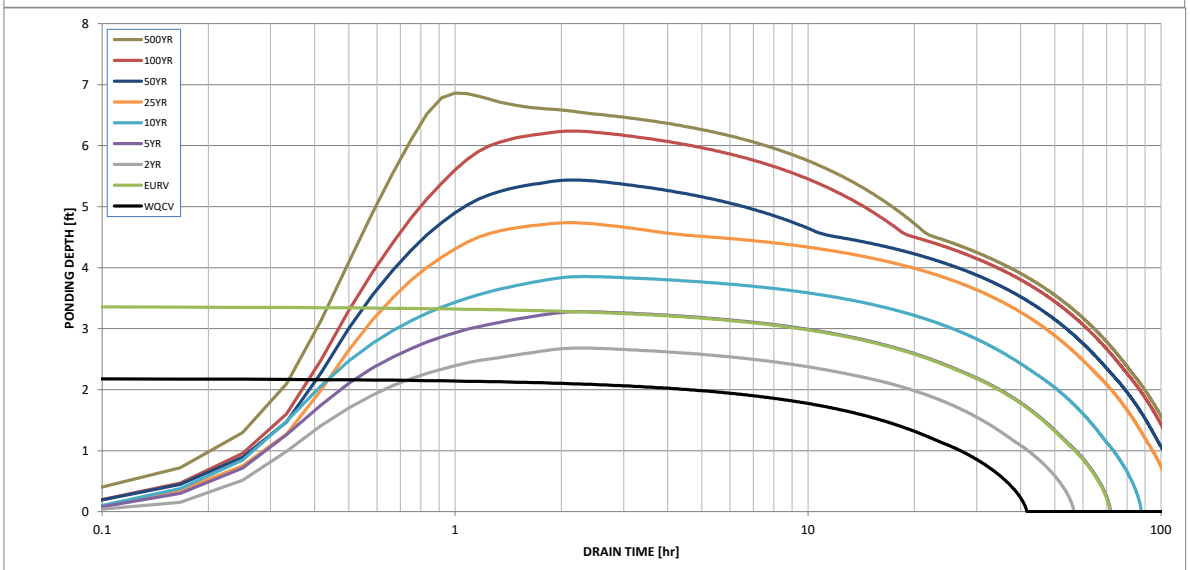
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

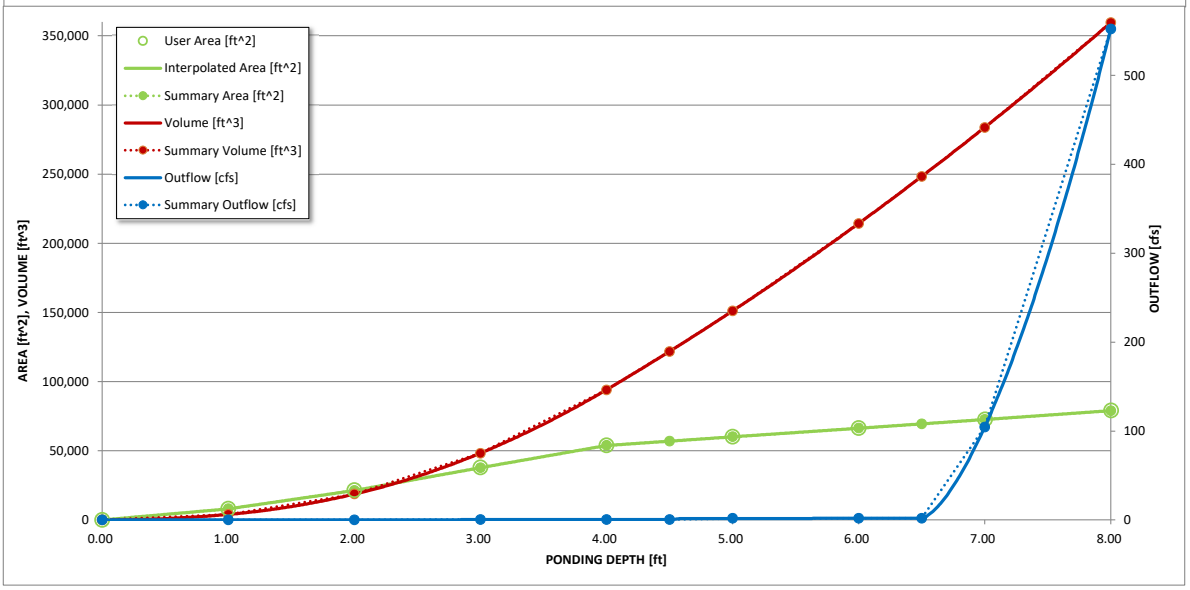
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.81	1.11	1.39	1.84	2.24	2.68	3.89
CUHP Runoff Volume (acre-ft) =	0.524	1.443	0.906	1.432	2.063	3.287	4.316	5.549	8.762
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.906	1.432	2.063	3.287	4.316	5.549	8.762
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.4	4.0	11.6	29.4	42.2	57.3	95.6
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.13	0.38	0.96	1.38	1.88	3.14
Peak Inflow Q (cfs) =	N/A	N/A	16.3	26.2	38.2	61.9	80.8	104.4	161.2
Peak Outflow Q (cfs) =	0.3	0.4	0.4	0.4	0.5	1.7	1.8	1.9	64.4
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.1	0.0	0.1	0.0	0.0	0.7
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Plate	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	0.0	0.0	0.0	0.1
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	63	51	64	77	94	98	102	99
Time to Drain 99% of Inflow Volume (hours) =	**40**	68	54	68	83	103	108	114	113
Maximum Ponding Depth (ft) =	2.18	3.36	2.68	3.28	3.85	4.73	5.43	6.24	6.86
Area at Maximum Ponding Depth (acres) =	0.56	1.00	0.75	0.97	1.18	1.34	1.44	1.56	1.65
Maximum Volume Stored (acre-ft) =	0.524	1.444	0.850	1.356	1.979	3.101	4.075	5.274	6.283

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]
	0.00	30	0.001	0	0.000	0.00
	1.00	8,038	0.185	4,034	0.093	0.10
	2.00	21,341	0.490	18,723	0.430	0.24
	3.00	37,767	0.867	48,277	1.108	0.41
	4.00	53,845	1.236	94,083	2.160	0.51
	4.50	56,987	1.308	121,791	2.796	0.56
	5.00	60,129	1.380	151,070	3.468	1.72
	6.00	66,332	1.523	214,301	4.920	1.88
	6.50	69,483	1.595	248,255	5.699	1.96
	7.00	72,635	1.667	283,784	6.515	104.49
	8.00	79,038	1.814	359,621	8.256	552.20

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

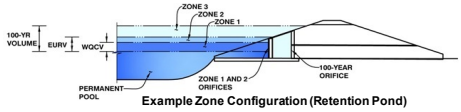
Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: NORTH WESTERLY

Basin ID: POND B



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	62.72	acres
Watershed Length =	2,662	ft
Watershed Length to Centroid =	982	ft
Watershed Slope =	0.021	ft/ft
Watershed Imperviousness =	48.92%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	Erie	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides
Water Quality Capture Volume (WQCV) =	1.063	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	2.898	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 0.81 in.) =	1.859	acre-feet	inches
5-yr Runoff Volume (P1 = 1.11 in.) =	2.956	acre-feet	inches
10-yr Runoff Volume (P1 = 1.39 in.) =	4.283	acre-feet	inches
25-yr Runoff Volume (P1 = 1.84 in.) =	6.870	acre-feet	inches
50-yr Runoff Volume (P1 = 2.24 in.) =	9.041	acre-feet	inches
100-yr Runoff Volume (P1 = 2.68 in.) =	11.645	acre-feet	inches
500-yr Runoff Volume (P1 = 3.89 in.) =	18.426	acre-feet	inches
Approximate 2-yr Detention Volume =	1.743	acre-feet	
Approximate 5-yr Detention Volume =	2.829	acre-feet	
Approximate 10-yr Detention Volume =	3.463	acre-feet	
Approximate 25-yr Detention Volume =	4.346	acre-feet	
Approximate 50-yr Detention Volume =	4.874	acre-feet	
Approximate 100-yr Detention Volume =	5.944	acre-feet	

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	1.063	acre-feet
Zone 2 Volume (EURV - Zone 1) =	1.835	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	3.046	acre-feet
Total Detention Basin Volume =	5.944	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

Depth Increment = ft

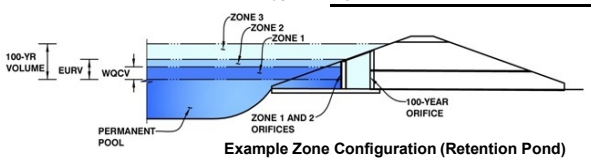
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	30	0.001		
5130	--	1.00	--	--	--	16,131	0.370	8,080	0.185
5131	--	2.00	--	--	--	49,541	1.137	40,916	0.939
5132	--	3.00	--	--	--	69,038	1.585	100,205	2.300
5133	--	4.00	--	--	--	75,024	1.722	172,236	3.954
5134	--	5.00	--	--	--	80,973	1.859	250,235	5.745
5135	--	6.00	--	--	--	87,023	1.998	334,233	7.673
5136	--	7.00	--	--	--	93,174	2.139	424,331	9.741
5137	--	8.00	--	--	--	99,425	2.282	520,631	11.952

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: NORTH WESTERLY

Basin ID: POND B



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.11	1.063	Orifice Plate
Zone 2 (EURV)	3.38	1.835	Orifice Plate
Zone 3 (100-year)	5.11	3.046	Weir&Pipe (Restrict)
Total (all zones)		5.944	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	3.993E-02	ft^2
Depth at top of Zone using Orifice Plate =	3.38	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	5.75	sq. inches (use rectangular openings)	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.08	2.17					
Orifice Area (sq. inches)	5.75	5.75	5.75					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected			Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A	N/A	feet
Vertical Orifice Diameter =	N/A	N/A	inches				

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Zone 3 Weir	Not Selected			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	4.00	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	4.00	N/A	feet
Overflow Weir Front Edge Length =	12.00	N/A	feet	Overflow Weir Slope Length =	6.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	10.14	N/A	
Horiz. Length of Weir Sides =	6.00	N/A	feet	Overflow Grate Open Area w/o Debris =	56.95	N/A	ft^2
Overflow Grate Type =	Close Mesh Grate	N/A		Overflow Grate Open Area w/ Debris =	28.48	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.30	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	5.62	N/A	ft^2
Outlet Pipe Diameter =	48.00	N/A	inches	Outlet Orifice Centroid =	1.06	N/A	feet
Restrictor Plate Height Above Pipe Invert =	22.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.49	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	6.25	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.74	feet
Spillway Crest Length =	90.00	feet	Stage at Top of Freeboard =	7.99	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	2.28	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	11.93	acre-ft

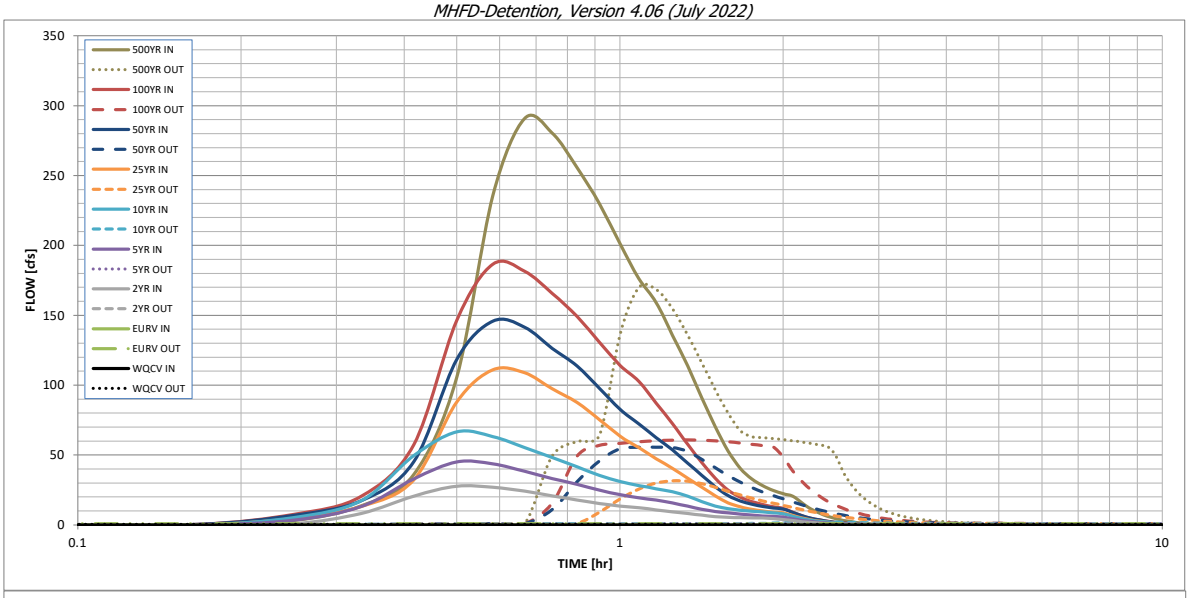
Calculated Parameters for Spillway

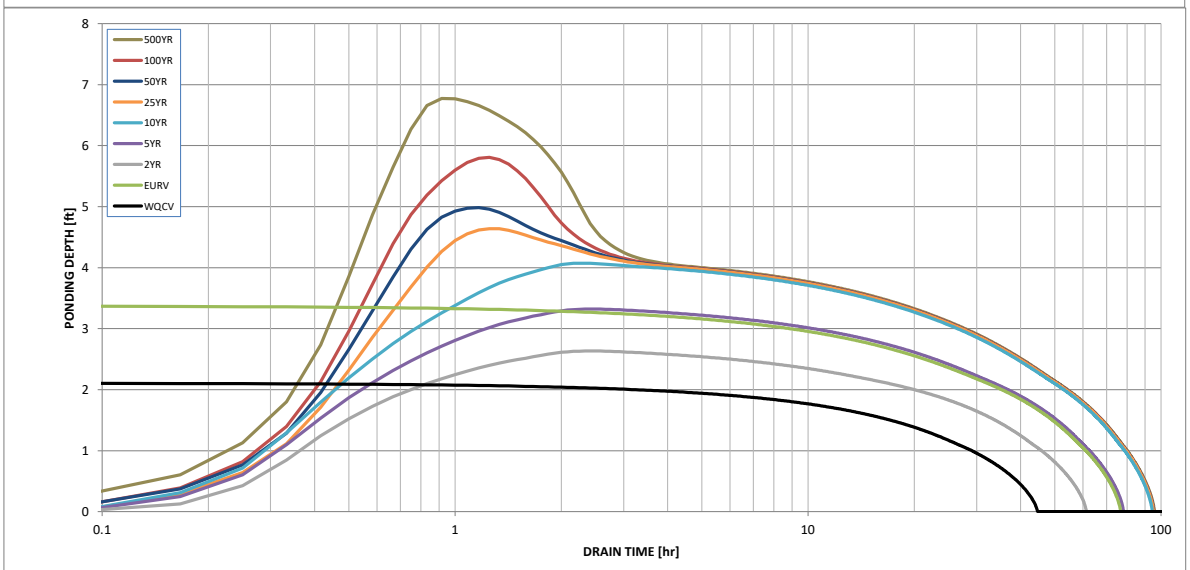
Routed Hydrograph Results *The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).*

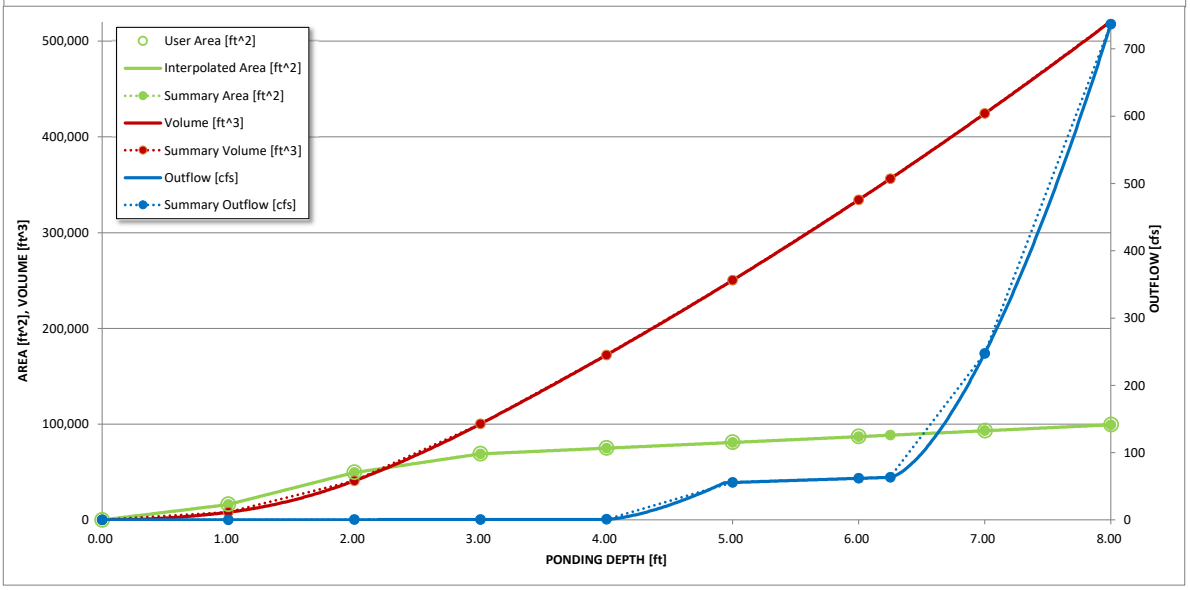
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.81	1.11	1.39	1.84	2.24	2.68	3.89
CUHP Runoff Volume (acre-ft) =	1.063	2.898	1.859	2.956	4.283	6.870	9.041	11.645	18.426
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	1.859	2.956	4.283	6.870	9.041	11.645	18.426
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.6	6.7	19.4	50.2	71.9	99.1	165.5
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.11	0.31	0.80	1.15	1.58	2.64
Peak Inflow Q (cfs) =	N/A	N/A	27.7	45.1	66.6	110.9	145.9	186.6	290.7
Peak Outflow Q (cfs) =	0.5	0.9	0.7	0.8	2.1	31.6	55.6	60.7	169.9
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.1	0.1	0.6	0.8	0.6	1.0
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.0	0.5	1.0	1.0	1.1
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	41	68	55	69	83	78	75	72	65
Time to Drain 99% of Inflow Volume (hours) =	**43**	73	59	74	89	88	86	85	80
Maximum Ponding Depth (ft) =	2.11	3.38	2.63	3.32	4.07	4.64	4.98	5.80	6.77
Area at Maximum Ponding Depth (acres) =	1.19	1.64	1.42	1.63	1.73	1.81	1.86	1.97	2.11
Maximum Volume Stored (acre-ft) =	1.067	2.913	1.745	2.798	4.075	5.066	5.707	7.276	9.253

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]
	0.00	30	0.001	0	0.000	0.00
	1.00	16,131	0.370	8,080	0.185	0.19
	2.00	49,541	1.137	40,916	0.939	0.46
	3.00	69,038	1.585	100,205	2.300	0.77
	4.00	75,024	1.722	172,236	3.954	0.97
	5.00	80,973	1.859	250,235	5.745	55.69
	6.00	87,023	1.998	334,233	7.673	61.91
	6.25	88,561	2.033	356,181	8.177	63.37
	7.00	93,174	2.139	424,331	9.741	247.61
	8.00	99,425	2.282	520,631	11.952	736.73

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

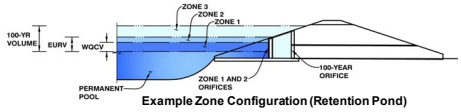
Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: NORTH WESTERLY

Basin ID: POND C



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	48.17	acres
Watershed Length =	1,762	ft
Watershed Length to Centroid =	759	ft
Watershed Slope =	0.023	ft/ft
Watershed Imperviousness =	65.00%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	Erie	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

		Optional User Overrides	
Water Quality Capture Volume (WQCV) =	1.020 acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	3.025 acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.81 in.) =	1.923 acre-feet		inches
5-yr Runoff Volume (P1 = 1.11 in.) =	2.897 acre-feet		inches
10-yr Runoff Volume (P1 = 1.39 in.) =	3.962 acre-feet		inches
25-yr Runoff Volume (P1 = 1.84 in.) =	5.904 acre-feet		inches
50-yr Runoff Volume (P1 = 2.24 in.) =	7.565 acre-feet		inches
100-yr Runoff Volume (P1 = 2.68 in.) =	9.503 acre-feet		inches
500-yr Runoff Volume (P1 = 3.89 in.) =	14.644 acre-feet		inches
Approximate 2-yr Detention Volume =	1.848 acre-feet		
Approximate 5-yr Detention Volume =	2.835 acre-feet		
Approximate 10-yr Detention Volume =	3.480 acre-feet		
Approximate 25-yr Detention Volume =	4.301 acre-feet		
Approximate 50-yr Detention Volume =	4.790 acre-feet		
Approximate 100-yr Detention Volume =	5.590 acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	1.020	acre-feet
Zone 2 Volume (EURV - Zone 1) =	2.005	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	2.565	acre-feet
Total Detention Basin Volume =	5.590	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

Depth Increment = ft

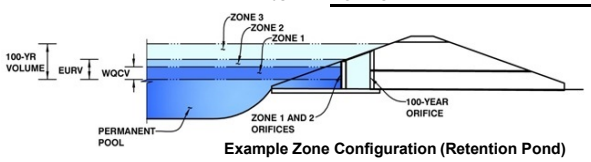
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	30	0.001		
5164	--	1.00	--	--	--	8,020	0.184	4,025	0.092
5165	--	2.00	--	--	--	28,156	0.646	22,113	0.508
5166	--	3.00	--	--	--	43,114	0.990	57,748	1.326
5167	--	4.00	--	--	--	48,140	1.105	103,375	2.373
5168	--	5.00	--	--	--	53,266	1.223	154,078	3.537
5169	--	6.00	--	--	--	58,494	1.343	209,958	4.820
5170	--	7.00	--	--	--	63,823	1.465	271,116	6.224
5171	--	8.00	--	--	--	69,253	1.590	337,654	7.751
5172	--	9.00	--	--	--	75,140	1.725	409,851	9.409

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: NORTH WESTERLY

Basin ID: POND C



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.68	1.020	Orifice Plate
Zone 2 (EURV)	4.58	2.005	Orifice Plate
Zone 3 (100-year)	6.56	2.565	Weir&Pipe (Restrict)
Total (all zones)		5.590	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

			Calculated Parameters for Underdrain		
Underdrain Orifice Invert Depth =		ft (distance below the filtration media surface)	Underdrain Orifice Area =		ft^2
Underdrain Orifice Diameter =		inches	Underdrain Orifice Centroid =		feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

			Calculated Parameters for Plate		
Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	3.646E-02	ft^2
Depth at top of Zone using Orifice Plate =	4.58	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	18.30	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	5.25	sq. inches (use rectangular openings)	Elliptical Slot Area =	N/A	ft^2

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.53	3.05					
Orifice Area (sq. inches)	5.25	5.25	5.25					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected		Calculated Parameters for Vertical Orifice	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A	N/A	feet
Vertical Orifice Diameter =	N/A	N/A	inches				

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Zone 3 Weir	Not Selected		Calculated Parameters for Overflow Weir	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	4.75	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	4.75	N/A	feet
Overflow Weir Front Edge Length =	8.00	N/A	feet	Overflow Weir Slope Length =	4.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	10.72	N/A	
Horiz. Length of Weir Sides =	4.00	N/A	feet	Overflow Grate Open Area w/o Debris =	25.31	N/A	ft^2
Overflow Grate Type =	Close Mesh Grate	N/A		Overflow Grate Open Area w/ Debris =	12.66	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected		Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.30	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	2.36	N/A	ft^2
Outlet Pipe Diameter =	36.00	N/A	inches	Outlet Orifice Centroid =	0.64	N/A	feet
Restrictor Plate Height Above Pipe Invert =	13.25		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.30	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

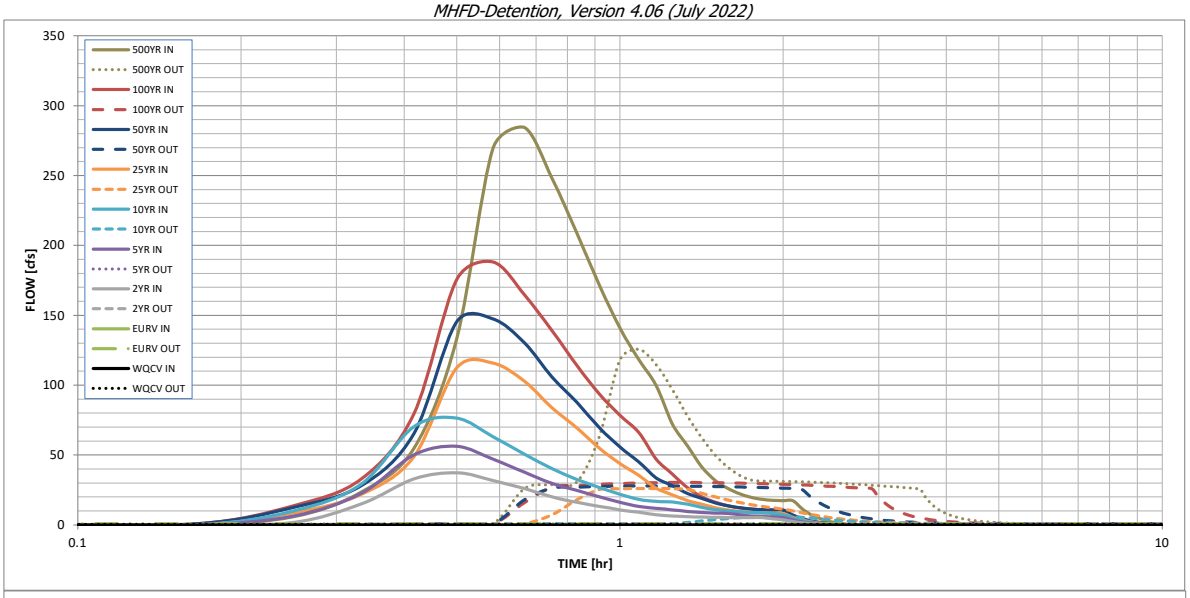
			Calculated Parameters for Spillway		
Spillway Invert Stage=	8.00	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.94	feet
Spillway Crest Length =	65.00	feet	Stage at Top of Freeboard =	9.94	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	1.87	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	11.10	acre-ft

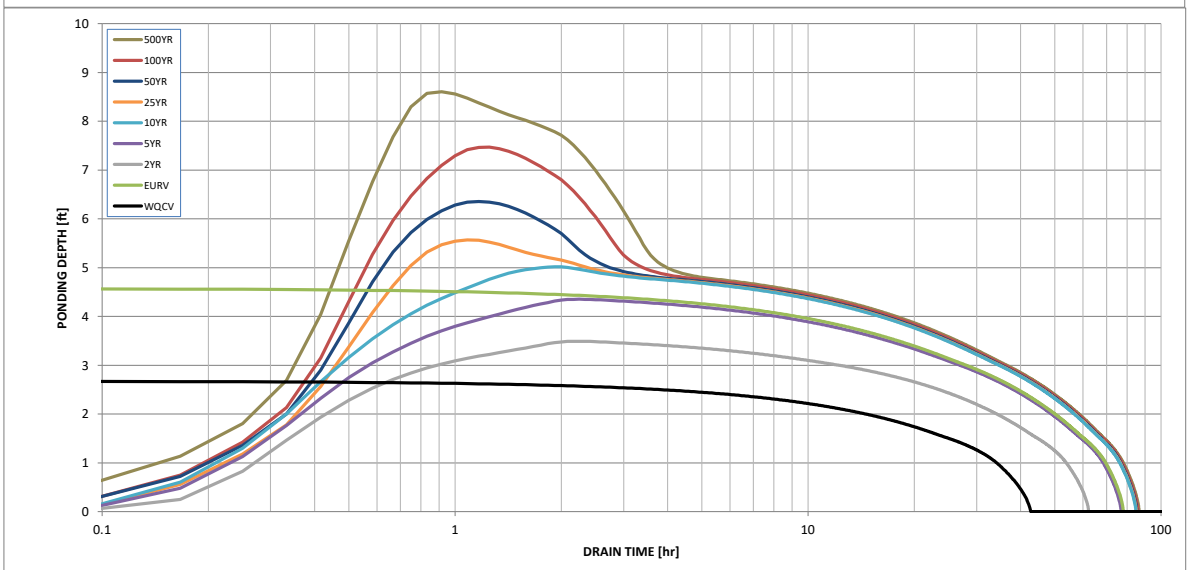
Routed Hydrograph Results — *The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).*

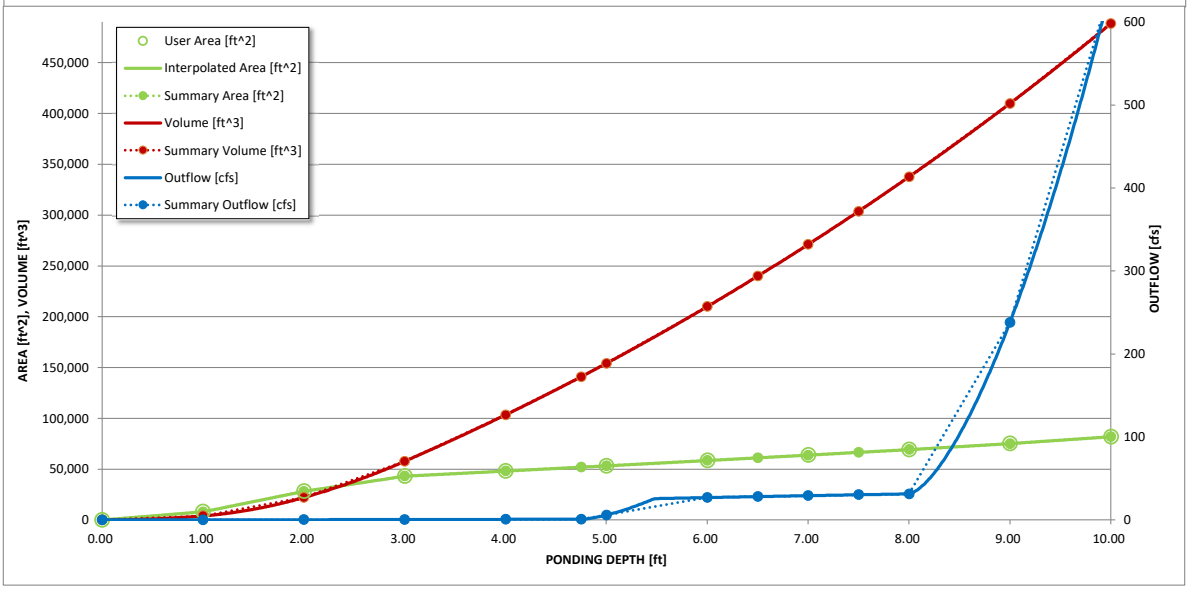
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.81	1.11	1.39	1.84	2.24	2.68	3.89
CUHP Runoff Volume (acre-ft) =	1.020	3.025	1.923	2.897	3.962	5.904	7.565	9.503	14.644
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	1.923	2.897	3.962	5.904	7.565	9.503	14.644
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.6	6.1	17.8	45.2	65.0	88.2	147.5
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.13	0.37	0.94	1.35	1.83	3.06
Peak Inflow Q (cfs) =	N/A	N/A	37.3	56.1	76.3	115.7	147.4	188.1	284.3
Peak Outflow Q (cfs) =	0.5	0.9	0.7	0.9	6.5	26.0	27.9	30.3	125.6
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.1	0.4	0.6	0.4	0.3	0.9
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.2	1.0	1.1	1.1	1.2
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	39	70	56	69	75	71	69	66	61
Time to Drain 99% of Inflow Volume (hours) =	**41**	75	60	74	80	79	78	78	75
Maximum Ponding Depth (ft) =	2.68	4.58	3.49	4.35	5.02	5.57	6.35	7.47	8.60
Area at Maximum Ponding Depth (acres) =	0.88	1.17	1.05	1.15	1.22	1.29	1.39	1.52	1.67
Maximum Volume Stored (acre-ft) =	1.027	3.034	1.814	2.767	3.549	4.241	5.297	6.911	8.713

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]
	0.00	30	0.001	0	0.000	0.00
	1.00	8,020	0.184	4,025	0.092	0.18
	2.00	28,156	0.646	22,113	0.508	0.37
	3.00	43,114	0.990	57,748	1.326	0.52
	4.00	48,140	1.105	103,375	2.373	0.80
	4.75	51,984	1.193	140,921	3.235	0.93
	5.00	53,266	1.223	154,078	3.537	5.95
	6.00	58,494	1.343	209,958	4.820	27.03
	6.50	61,158	1.404	239,871	5.507	28.20
	7.00	63,823	1.465	271,116	6.224	29.32
	7.50	66,538	1.528	303,706	6.972	30.41
	8.00	69,253	1.590	337,654	7.751	31.45
	9.00	75,140	1.725	409,851	9.409	238.04
	10.00	81,903	1.880	488,372	11.211	641.17

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

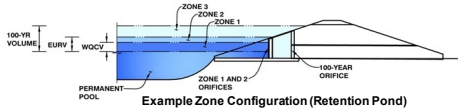
Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: NORTH WESTERLY

Basin ID: POND D



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	22.38	acres
Watershed Length =	1,138	ft
Watershed Length to Centroid =	356	ft
Watershed Slope =	0.020	ft/ft
Watershed Imperviousness =	65.00%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	Erie	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides
Water Quality Capture Volume (WQCV) =	0.474	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	1.405	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 0.81 in.) =	0.872	acre-feet	inches
5-yr Runoff Volume (P1 = 1.11 in.) =	1.312	acre-feet	inches
10-yr Runoff Volume (P1 = 1.39 in.) =	1.794	acre-feet	inches
25-yr Runoff Volume (P1 = 1.84 in.) =	2.672	acre-feet	inches
50-yr Runoff Volume (P1 = 2.24 in.) =	3.423	acre-feet	inches
100-yr Runoff Volume (P1 = 2.68 in.) =	4.299	acre-feet	inches
500-yr Runoff Volume (P1 = 3.89 in.) =	6.624	acre-feet	inches
Approximate 2-yr Detention Volume =	0.859	acre-feet	
Approximate 5-yr Detention Volume =	1.317	acre-feet	
Approximate 10-yr Detention Volume =	1.617	acre-feet	
Approximate 25-yr Detention Volume =	1.998	acre-feet	
Approximate 50-yr Detention Volume =	2.225	acre-feet	
Approximate 100-yr Detention Volume =	2.597	acre-feet	

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.474	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.931	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	1.192	acre-feet
Total Detention Basin Volume =	2.597	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

Depth Increment = ft

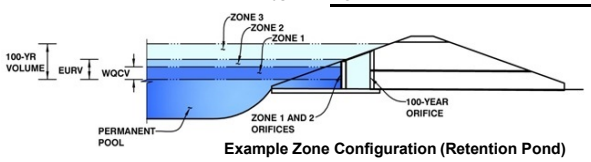
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	30	0.001		
5190	--	1.00	--	--	--	12,527	0.288	6,278	0.144
5191	--	2.00	--	--	--	34,938	0.802	30,011	0.689
5192	--	3.00	--	--	--	43,443	0.997	69,201	1.589
5193	--	4.00	--	--	--	47,367	1.087	114,606	2.631
5194	--	5.00	--	--	--	51,397	1.180	163,988	3.765
5195	--	6.00	--	--	--	55,532	1.275	217,453	4.992
5196	--	7.00	--	--	--	59,774	1.372	275,106	6.316
5197	--	8.00	--	--	--	64,122	1.472	337,054	7.738

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: **NORTH WESTERLY**

Basin ID: **POND D**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.71	0.474	Orifice Plate
Zone 2 (EURV)	2.82	0.931	Orifice Plate
Zone 3 (100-year)	3.97	1.192	Weir&Pipe (Restrict)
Total (all zones)		2.597	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	2.236E-02	ft^2
Depth at top of Zone using Orifice Plate =	2.82	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	3.22	sq. inches (diameter = 2 inches)	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.92	1.83					
Orifice Area (sq. inches)	3.22	3.22	3.22					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected			Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A	N/A	feet
Vertical Orifice Diameter =	N/A	N/A	inches				

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Zone 3 Weir	Not Selected			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	3.50	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	3.50	N/A	feet
Overflow Weir Front Edge Length =	6.00	N/A	feet	Overflow Weir Slope Length =	4.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	164.69	N/A	
Horiz. Length of Weir Sides =	4.00	N/A	feet	Overflow Grate Open Area w/o Debris =	18.98	N/A	ft^2
Overflow Grate Type =	Close Mesh Grate	N/A		Overflow Grate Open Area w/ Debris =	9.49	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.30	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	0.12	N/A	ft^2
Outlet Pipe Diameter =	18.00	N/A	inches	Outlet Orifice Centroid =	0.10	N/A	feet
Restrictor Plate Height Above Pipe Invert =	2.10		inches	Half-Central Angle of Restrictor Plate on Pipe =	0.70	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	6.25	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.74	feet
Spillway Crest Length =	45.00	feet	Stage at Top of Freeboard =	7.99	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	1.47	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	7.72	acre-ft

Calculated Parameters for Spillway

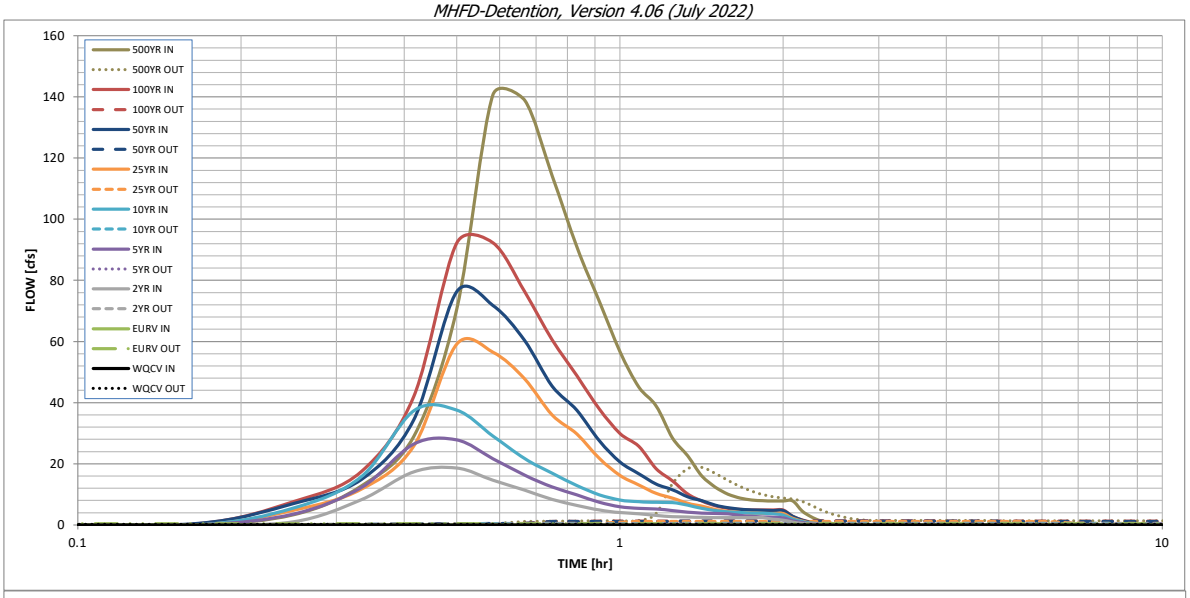
Routed Hydrograph Results

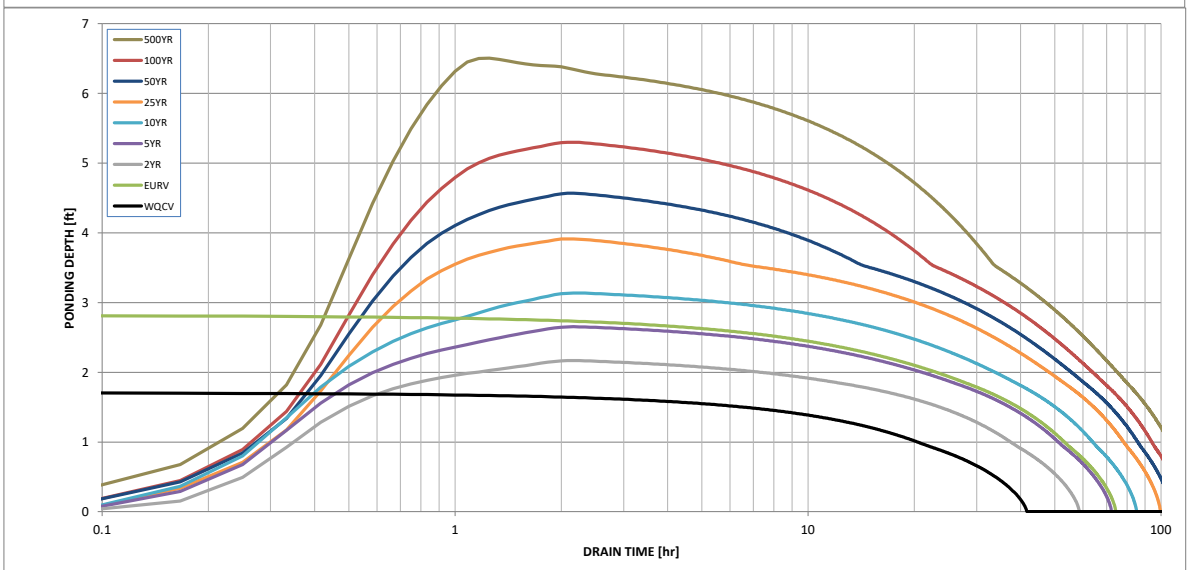
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

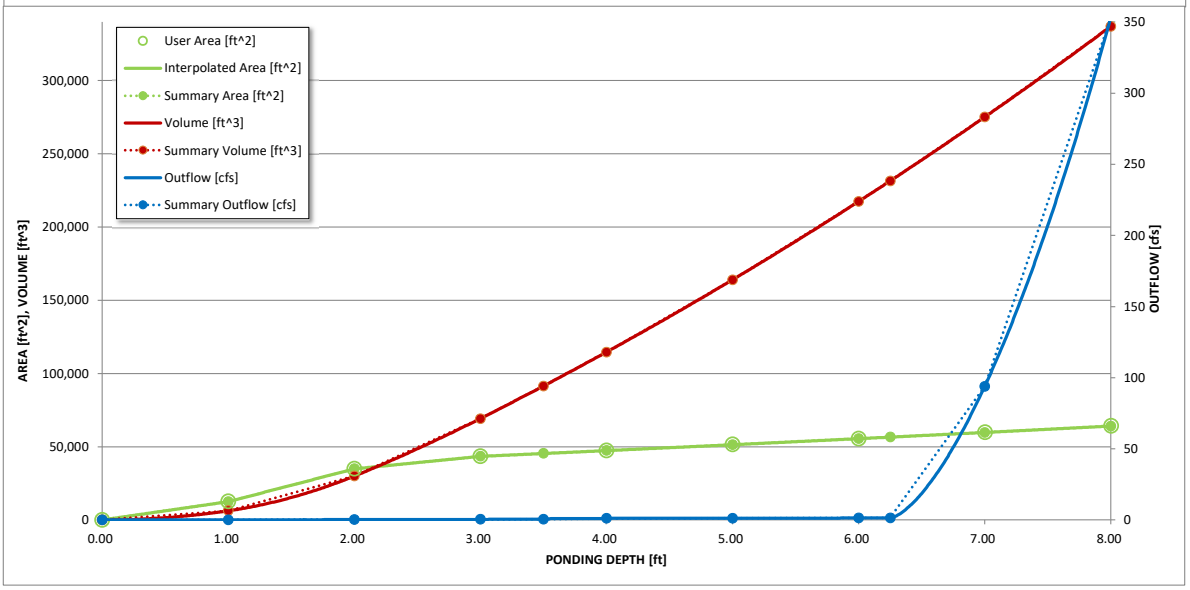
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.81	1.11	1.39	1.84	2.24	2.68	3.89
CUHP Runoff Volume (acre-ft) =	0.474	1.405	0.872	1.312	1.794	2.672	3.423	4.299	6.624
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.872	1.312	1.794	2.672	3.423	4.299	6.624
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.3	3.4	9.5	24.0	34.2	46.4	77.2
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.15	0.43	1.07	1.53	2.07	3.45
Peak Inflow Q (cfs) =	N/A	N/A	18.6	27.8	37.6	59.1	76.3	92.3	140.6
Peak Outflow Q (cfs) =	0.2	0.4	0.3	0.4	0.5	1.1	1.2	1.3	18.8
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.1	0.0	0.0	0.0	0.0	0.2
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Plate	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	0.0	0.0	0.0	0.0
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	66	53	64	75	86	90	96	101
Time to Drain 99% of Inflow Volume (hours) =	**40**	71	56	69	81	94	100	107	115
Maximum Ponding Depth (ft) =	1.71	2.82	2.16	2.65	3.13	3.91	4.56	5.30	6.50
Area at Maximum Ponding Depth (acres) =	0.65	0.96	0.83	0.93	1.01	1.08	1.14	1.21	1.32
Maximum Volume Stored (acre-ft) =	0.478	1.412	0.820	1.252	1.719	2.533	3.254	4.111	5.642

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]
	0.00	30	0.001	0	0.000	0.00
	1.00	12,527	0.288	6,278	0.144	0.14
	2.00	34,938	0.802	30,011	0.689	0.31
	3.00	43,443	0.997	69,201	1.589	0.46
	3.50	45,405	1.042	91,413	2.099	0.51
	4.00	47,367	1.087	114,606	2.631	1.14
	5.00	51,397	1.180	163,988	3.765	1.27
	6.00	55,532	1.275	217,453	4.992	1.38
	6.25	56,592	1.299	231,468	5.314	1.41
	7.00	59,774	1.372	275,106	6.316	93.85
	8.00	64,122	1.472	337,054	7.738	353.01

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

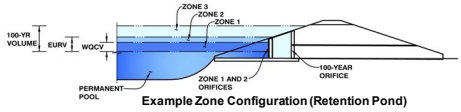
Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: NORTH WESTERLY

Basin ID: POND E



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	163.55	acres
Watershed Length =	3,908	ft
Watershed Length to Centroid =	1,256	ft
Watershed Slope =	0.014	ft/ft
Watershed Imperviousness =	65.00%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	Erie	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

		Optional User Overrides	
Water Quality Capture Volume (WQCV) =	3.464 acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	10.271 acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.81 in.) =	6.704 acre-feet		inches
5-yr Runoff Volume (P1 = 1.11 in.) =	10.096 acre-feet		inches
10-yr Runoff Volume (P1 = 1.39 in.) =	13.801 acre-feet		inches
25-yr Runoff Volume (P1 = 1.84 in.) =	20.560 acre-feet		inches
50-yr Runoff Volume (P1 = 2.24 in.) =	26.339 acre-feet		inches
100-yr Runoff Volume (P1 = 2.68 in.) =	33.080 acre-feet		inches
500-yr Runoff Volume (P1 = 3.89 in.) =	50.965 acre-feet		inches
Approximate 2-yr Detention Volume =	6.274 acre-feet		
Approximate 5-yr Detention Volume =	9.627 acre-feet		
Approximate 10-yr Detention Volume =	11.815 acre-feet		
Approximate 25-yr Detention Volume =	14.601 acre-feet		
Approximate 50-yr Detention Volume =	16.263 acre-feet		
Approximate 100-yr Detention Volume =	18.979 acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	3.464	acre-feet
Zone 2 Volume (EURV - Zone 1) =	6.807	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	8.709	acre-feet
Total Detention Basin Volume =	18.979	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

Depth Increment = ft

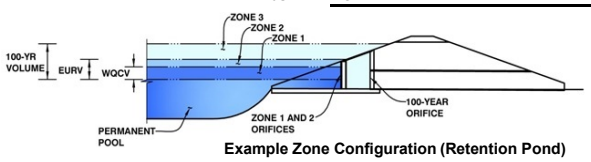
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	30	0.001		
5163	--	1.00	--	--	--	10,404	0.239	5,217	0.120
5164	--	2.00	--	--	--	42,330	0.972	31,584	0.725
5165	--	3.00	--	--	--	101,704	2.335	103,600	2.378
5166	--	4.00	--	--	--	187,065	4.294	247,985	5.693
5167	--	5.00	--	--	--	249,631	5.731	466,333	10.706
5168	--	6.00	--	--	--	276,666	6.351	729,481	16.747
5169	--	7.00	--	--	--	292,899	6.724	1,014,264	23.284
5170	--	8.00	--	--	--	304,048	6.980	1,312,737	30.136
5171	--	9.00	--	--	--	313,172	7.189	1,621,347	37.221
5172	--	10.00	--	--	--	322,396	7.401	1,939,131	44.516

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: NORTH WESTERLY

Basin ID: POND E



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.40	3.464	Orifice Plate
Zone 2 (EURV)	4.93	6.807	Orifice Plate
Zone 3 (100-year)	6.35	8.709	Weir&Pipe (Restrict)
Total (all zones)		18.979	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	4.93	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	sq. inches	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.75	3.50					
Orifice Area (sq. inches)	14.00	14.00	20.00					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected			Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A	N/A	feet
Vertical Orifice Diameter =	N/A	N/A	inches				

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Zone 3 Weir	Not Selected			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	5.25	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	5.25	N/A	feet
Overflow Weir Front Edge Length =	8.00	N/A	feet	Overflow Weir Slope Length =	4.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	61.47	N/A	
Horiz. Length of Weir Sides =	4.00	N/A	feet	Overflow Grate Open Area w/o Debris =	25.31	N/A	ft^2
Overflow Grate Type =	Close Mesh Grate	N/A		Overflow Grate Open Area w/ Debris =	12.66	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.30	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	0.41	N/A	ft^2
Outlet Pipe Diameter =	18.00	N/A	inches	Outlet Orifice Centroid =	0.25	N/A	feet
Restrictor Plate Height Above Pipe Invert =	5.10		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.12	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	8.60	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.77	feet
Spillway Crest Length =	300.00	feet	Stage at Top of Freeboard =	9.87	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	7.37	acres
Freeboard above Max Water Surface =	0.50	feet	Basin Volume at Top of Freeboard =	43.56	acre-ft

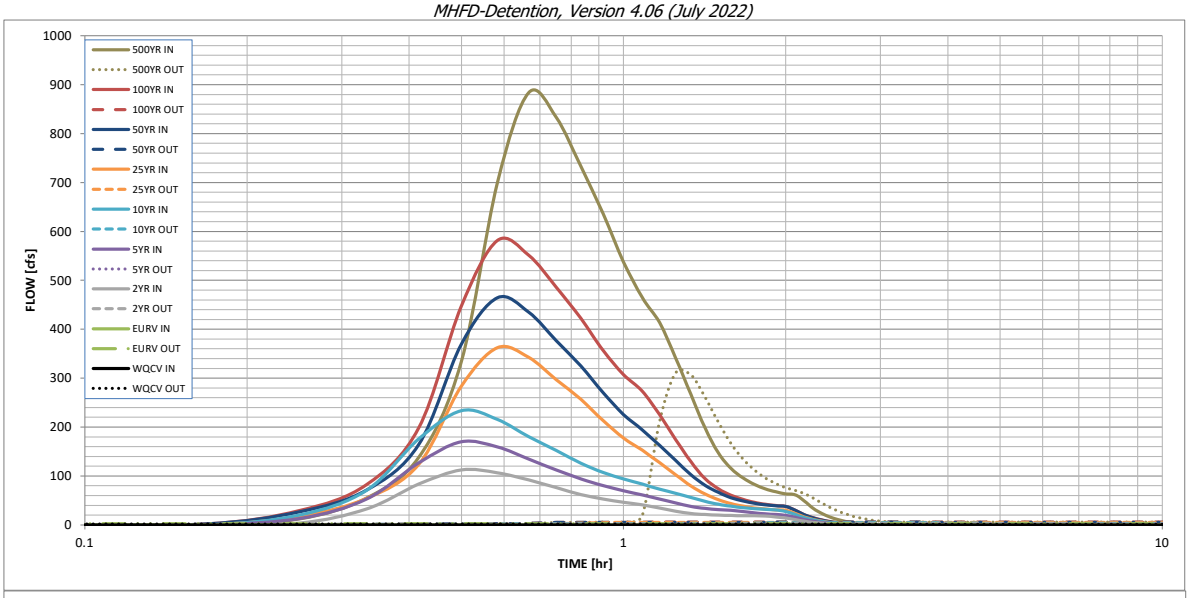
Calculated Parameters for Spillway

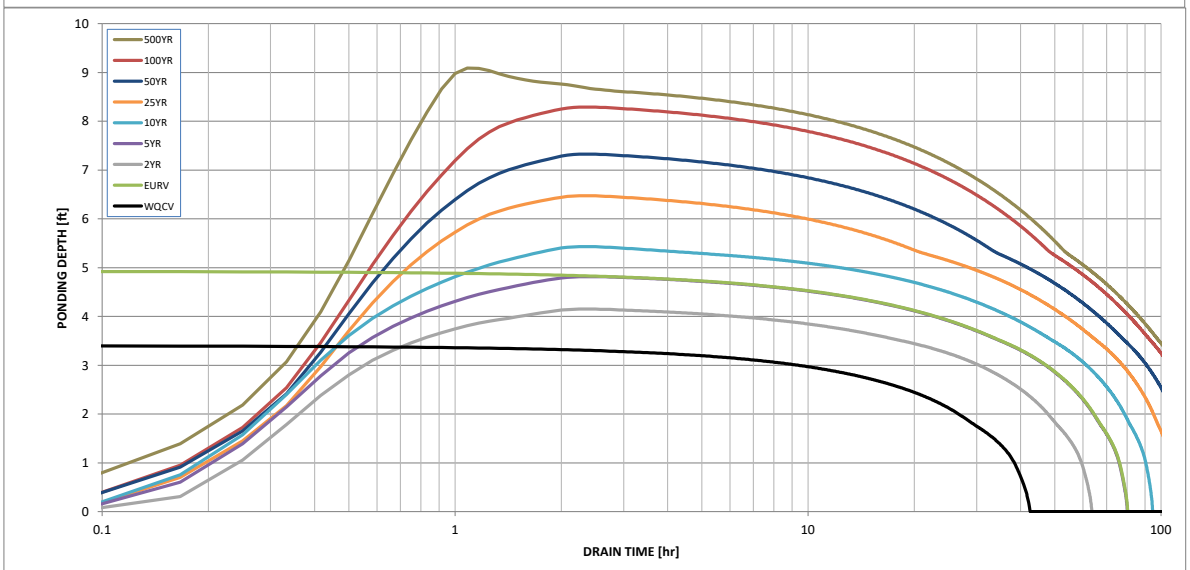
Routed Hydrograph Results *The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).*

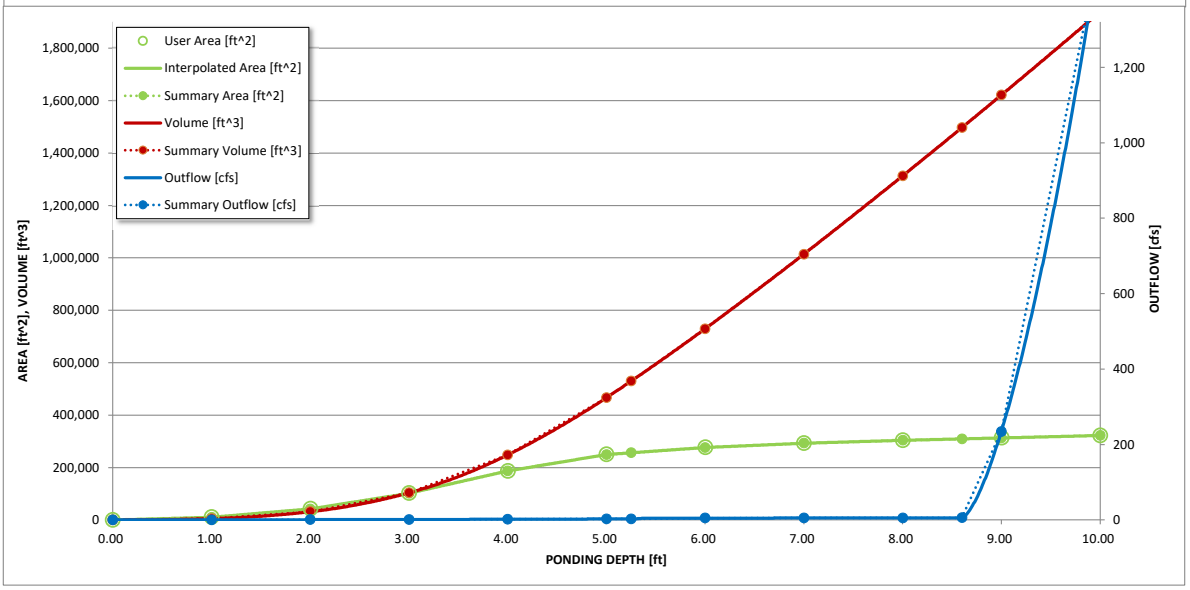
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.81	1.11	1.39	1.84	2.24	2.68	3.89
CUHP Runoff Volume (acre-ft) =	3.464	10.271	6.704	10.096	13.801	20.560	26.339	33.080	50.965
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	6.704	10.096	13.801	20.560	26.339	33.080	50.965
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	1.6	16.9	49.8	129.4	185.5	256.2	428.4
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.10	0.30	0.79	1.13	1.57	2.62
Peak Inflow Q (cfs) =	N/A	N/A	112.2	169.9	233.6	362.4	464.2	581.2	883.3
Peak Outflow Q (cfs) =	1.5	2.7	2.2	2.6	4.6	5.1	5.4	5.7	310.6
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.2	0.1	0.0	0.0	0.0	0.7
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.1	0.1	0.1	0.1	0.1
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	39	72	58	72	84	97	108	120	119
Time to Drain 99% of Inflow Volume (hours) =	**41**	77	61	77	90	105	117	>120	>120
Maximum Ponding Depth (ft) =	3.40	4.93	4.15	4.81	5.43	6.47	7.32	8.29	9.08
Area at Maximum Ponding Depth (acres) =	3.12	5.63	4.51	5.46	5.99	6.53	6.81	7.04	7.21
Maximum Volume Stored (acre-ft) =	3.469	10.308	6.353	9.643	13.167	19.773	25.449	32.099	37.797

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]
	0.00	30	0.001	0	0.000	0.00
	1.00	10,404	0.239	5,217	0.120	0.47
	2.00	42,330	0.972	31,584	0.725	0.90
	3.00	101,704	2.335	103,600	2.378	1.33
	4.00	187,065	4.294	247,985	5.693	2.11
	5.00	249,631	5.731	466,333	10.706	2.71
	5.25	256,390	5.886	529,585	12.158	2.83
	6.00	276,666	6.351	729,481	16.747	4.88
	7.00	292,899	6.724	1,014,264	23.284	5.26
	8.00	304,048	6.980	1,312,737	30.136	5.63
	8.60	309,522	7.106	1,496,808	34.362	5.83
	9.00	313,172	7.189	1,621,347	37.221	234.62
	10.00	322,396	7.401	1,939,131	44.516	1,519.40

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

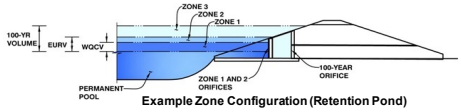
Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: NORTH WESTERLY

Basin ID: POND F



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	85.75	acres
Watershed Length =	3,256	ft
Watershed Length to Centroid =	1,679	ft
Watershed Slope =	0.016	ft/ft
Watershed Imperviousness =	50.00%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	Erie	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides
Water Quality Capture Volume (WQCV) =	1.474	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	4.056	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 0.81 in.) =	2.617	acre-feet	inches
5-yr Runoff Volume (P1 = 1.11 in.) =	4.140	acre-feet	inches
10-yr Runoff Volume (P1 = 1.39 in.) =	5.970	acre-feet	inches
25-yr Runoff Volume (P1 = 1.84 in.) =	9.521	acre-feet	inches
50-yr Runoff Volume (P1 = 2.24 in.) =	12.506	acre-feet	inches
100-yr Runoff Volume (P1 = 2.68 in.) =	16.078	acre-feet	inches
500-yr Runoff Volume (P1 = 3.89 in.) =	25.396	acre-feet	inches
Approximate 2-yr Detention Volume =	2.443	acre-feet	
Approximate 5-yr Detention Volume =	3.947	acre-feet	
Approximate 10-yr Detention Volume =	4.830	acre-feet	
Approximate 25-yr Detention Volume =	6.054	acre-feet	
Approximate 50-yr Detention Volume =	6.787	acre-feet	
Approximate 100-yr Detention Volume =	8.248	acre-feet	

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	1.474	acre-feet
Zone 2 Volume (EURV - Zone 1) =	2.582	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	4.192	acre-feet
Total Detention Basin Volume =	8.248	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

Depth Increment = ft

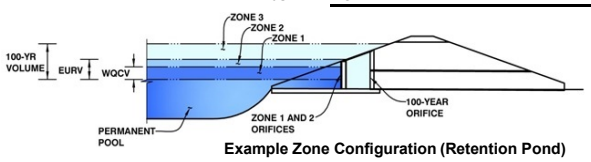
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	30	0.001		
5133	--	1.00	--	--	--	12,696	0.291	6,363	0.146
5134	--	2.00	--	--	--	50,865	1.168	38,143	0.876
5135	--	3.00	--	--	--	100,624	2.310	113,887	2.614
5136	--	4.00	--	--	--	146,171	3.356	237,285	5.447
5137	--	5.00	--	--	--	174,141	3.998	397,441	9.124
5138	--	6.00	--	--	--	184,737	4.241	576,880	13.243
5139	--	7.00	--	--	--	191,655	4.400	765,076	17.564
5140	--	8.00	--	--	--	198,674	4.561	960,240	22.044
5141	--	9.00	--	--	--	205,793	4.724	1,162,474	26.687
5142	--	10.00	--	--	--	213,013	4.890	1,371,877	31.494

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: NORTH WESTERLY

Basin ID: POND F



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.43	1.474	Orifice Plate
Zone 2 (EURV)	3.56	2.582	Orifice Plate
Zone 3 (100-year)	4.78	4.192	Weir&Pipe (Restrict)
Total (all zones)		8.248	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	5.063E-02	ft^2
Depth at top of Zone using Orifice Plate =	3.56	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	7.29	sq. inches (use rectangular openings)	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.17	2.33					
Orifice Area (sq. inches)	7.29	7.29	7.29					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected			Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A	N/A	feet
Vertical Orifice Diameter =	N/A	N/A	inches				

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Zone 3 Weir	Not Selected			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	4.00	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	4.00	N/A	feet
Overflow Weir Front Edge Length =	8.00	N/A	feet	Overflow Weir Slope Length =	4.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	86.56	N/A	
Horiz. Length of Weir Sides =	4.00	N/A	feet	Overflow Grate Open Area w/o Debris =	25.31	N/A	ft^2
Overflow Grate Type =	Close Mesh Grate	N/A		Overflow Grate Open Area w/ Debris =	12.66	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.30	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	0.29	N/A	ft^2
Outlet Pipe Diameter =	18.00	N/A	inches	Outlet Orifice Centroid =	0.20	N/A	feet
Restrictor Plate Height Above Pipe Invert =	4.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	0.98	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	6.75	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.79	feet
Spillway Crest Length =	100.00	feet	Stage at Top of Freeboard =	8.54	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	4.65	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	24.53	acre-ft

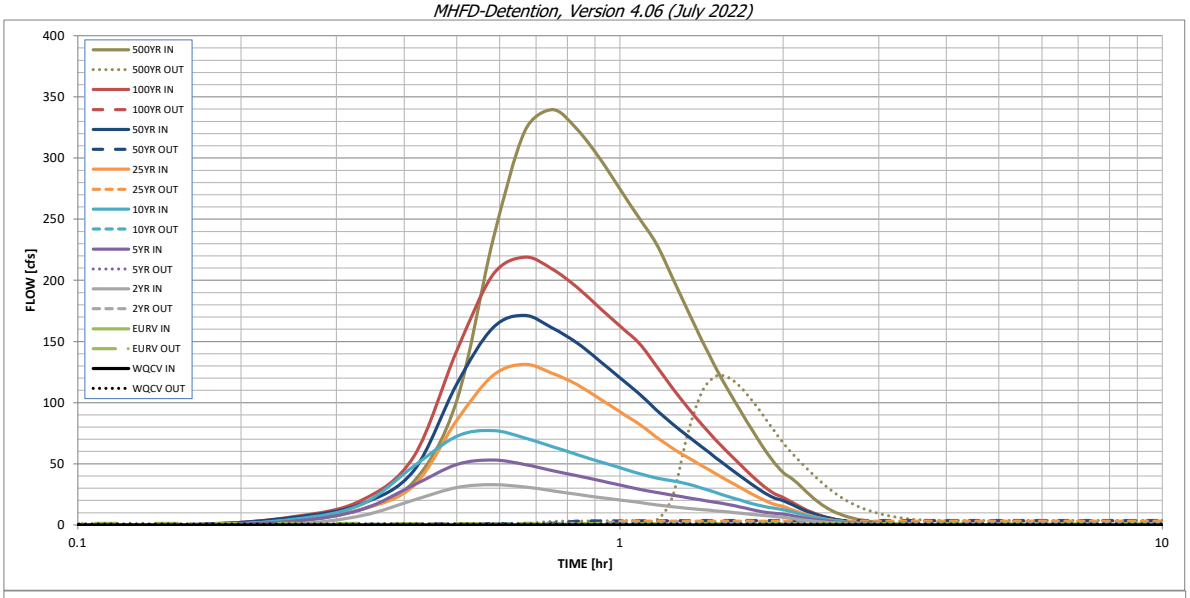
Calculated Parameters for Spillway

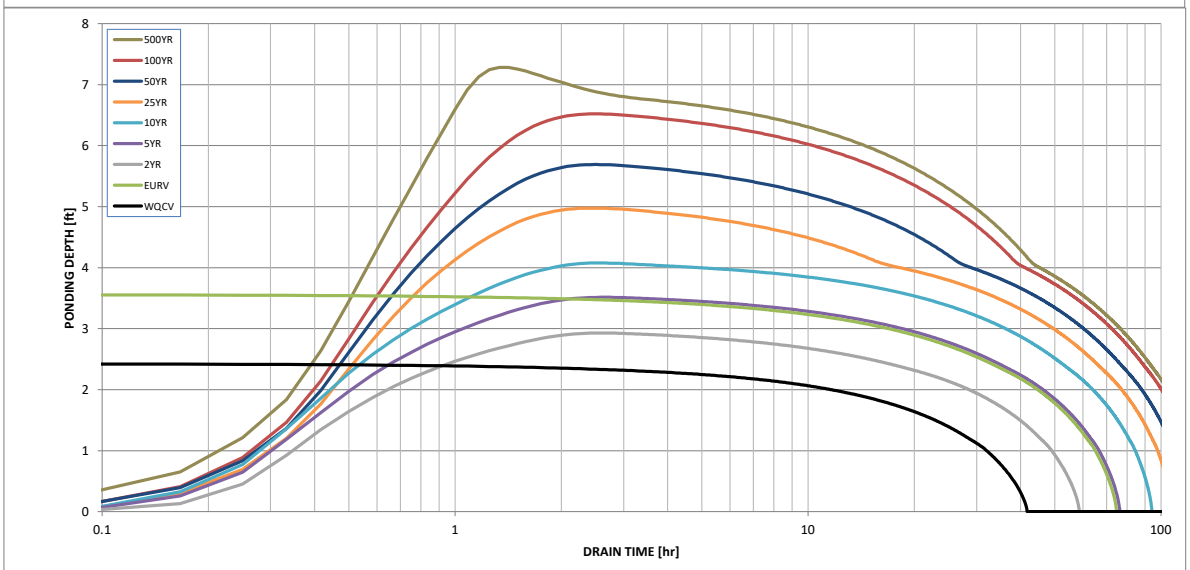
Routed Hydrograph Results *The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).*

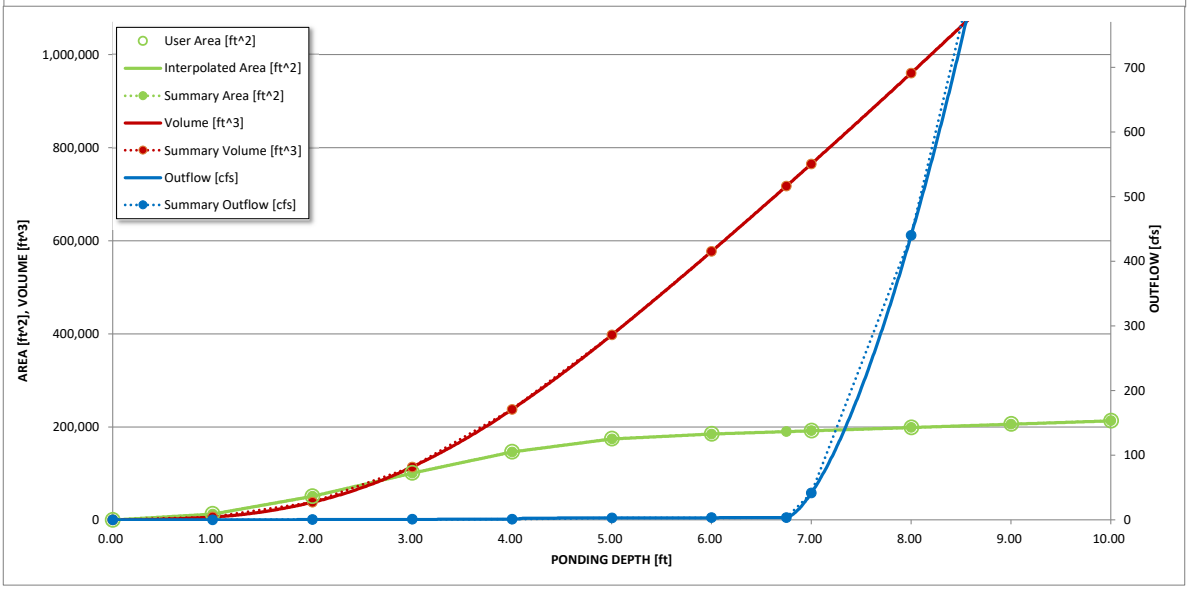
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.81	1.11	1.39	1.84	2.24	2.68	3.89
CUHP Runoff Volume (acre-ft) =	1.474	4.056	2.617	4.140	5.970	9.521	12.506	16.078	25.396
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	2.617	4.140	5.970	9.521	12.506	16.078	25.396
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.7	7.1	21.0	55.7	80.1	110.9	186.2
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.08	0.25	0.65	0.93	1.29	2.17
Peak Inflow Q (cfs) =	N/A	N/A	32.9	53.1	77.0	131.3	171.4	218.9	339.6
Peak Outflow Q (cfs) =	0.7	1.1	0.9	1.1	2.0	3.2	3.4	3.6	121.3
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.2	0.1	0.1	0.0	0.0	0.7
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.0	0.1	0.1	0.1	0.1
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	66	53	68	83	92	100	110	107
Time to Drain 99% of Inflow Volume (hours) =	**40**	71	56	73	89	101	110	>120	>120
Maximum Ponding Depth (ft) =	2.43	3.56	2.93	3.51	4.07	4.97	5.69	6.52	7.28
Area at Maximum Ponding Depth (acres) =	1.66	2.90	2.22	2.84	3.40	3.98	4.16	4.32	4.44
Maximum Volume Stored (acre-ft) =	1.483	4.072	2.433	3.929	5.684	9.004	11.899	15.427	18.758

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]
	0.00	30	0.001	0	0.000	0.00
	1.00	12,696	0.291	6,363	0.146	0.24
	2.00	50,865	1.168	38,143	0.876	0.57
	3.00	100,624	2.310	113,887	2.614	0.95
	4.00	146,171	3.356	237,285	5.447	1.21
	5.00	174,141	3.998	397,441	9.124	3.18
	6.00	184,737	4.241	576,880	13.243	3.48
	6.75	189,925	4.360	717,378	16.469	3.69
	7.00	191,655	4.400	765,076	17.564	41.55
	8.00	198,674	4.561	960,240	22.044	440.04
	9.00	205,793	4.724	1,162,474	26.687	1,089.65
	10.00	213,013	4.890	1,371,877	31.494	1,944.98

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Sep 17 2024

WELD COUNTY ROAD 10 - UPGRADED CULVERT CROSSING (100-YR)

Invert Elev Dn (ft)	=	5119.63
Pipe Length (ft)	=	40.00
Slope (%)	=	0.50
Invert Elev Up (ft)	=	5119.83
Rise (in)	=	36.0
Shape	=	Box
Span (in)	=	48.0
No. Barrels	=	4
n-Value	=	0.013
Culvert Type	=	Flared Wingwalls
Culvert Entrance	=	30D to 75D wingwall flares
Coeff. K,M,c,Y,k	=	0.026, 1, 0.0347, 0.81, 0.4

Embankment

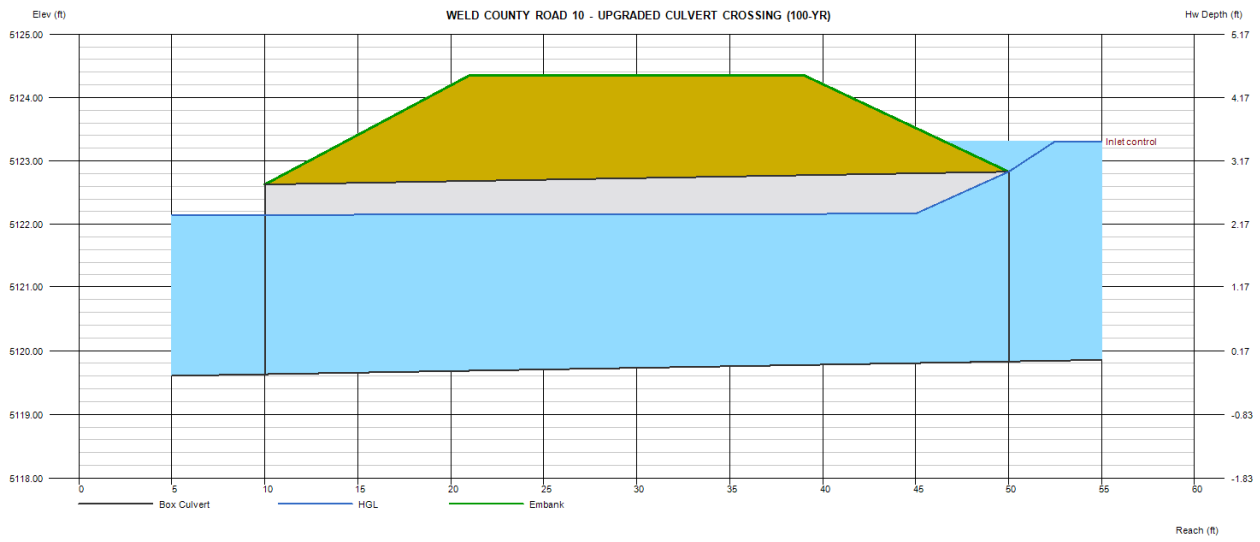
Top Elevation (ft)	=	5124.35
Top Width (ft)	=	18.00
Crest Width (ft)	=	50.00

Calculations

Qmin (cfs)	=	264.90
Qmax (cfs)	=	264.90
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	264.90
Qpipe (cfs)	=	264.90
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	6.57
Veloc Up (ft/s)	=	7.07
HGL Dn (ft)	=	5122.15
HGL Up (ft)	=	5122.17
Hw Elev (ft)	=	5123.31
Hw/D (ft)	=	1.16
Flow Regime	=	Inlet Control



Appendix D

Erie OSP Reference Material

Since the ditch capacity north of WCR 10 1/2 is limited, the Town preferred to route as much runoff as possible to the west, directly to Coal Creek. This recommended plan includes rerouting the majority of flow west across County Line Road in a 7'x5' RCBC then conveying runoff to Coal Creek in a new outfall channel with 100-year capacity. The new channel and outfall to Coal Creek (930A) is proposed since it has a shorter alignment with an adequate slope to Coal Creek compared to the existing Outfall 930 alignment. The remaining runoff (54 cfs) is routed across WCR 10 1/2 in existing culverts to the existing ditch along the east side of County Line Road.

Outfall 287A

Reach 1 (Figure D-3)

Proposed Improvement Categories:

100-year Detention
100-year Conveyance
Culvert Improvements

As previously mentioned for Outfall 930A, the capacity of the existing roadside ditch along the east side of County Line Road is limited and the Town would prefer to reroute runoff directly to Coal Creek. The recommended plan includes creating Outfall 287A south of the existing Outfall 287 location. The recommended plan for Reach 1 includes incorporating drainage plans for the west side of the Morgan Hill development, including redefining the tributary area boundaries. The proposed 3.9 acre-feet detention pond and outlet pipe conveyance to the Boulder and Weld County Ditch is based on the planned design for Pond B per the *Phase 3 Drainage Report for Morgan Hill Filing No. 1*, dated May 3, 2018. This recommended plan continues to convey runoff to the new outfall with 100-year capacity channels and an 8'x3' RCBC across County Line Road.

Reach 2 (Figure D-3)

Proposed Improvement Categories:

Major Drainageway Preservation

With the majority of the flow from the Northridge development being rerouted to new Outfall 930A, the recommended plan for Reach 2 of Outfall 287A is to preserve and stabilize the roadside ditch.

BOULDER CREEK TRIBUTARIES

Outfall 943A

Reach 1 (Figure D-4 and D-3)

Proposed Improvement Categories:

Major Drainageway Preservation

With new Outfalls 930A and 287A diverting runoff to Coal Creek, the roadside ditch along the east side of County Line Road has capacity to contain the 100-year storm event. However, with the additional rerouted flow from Outfall 950 Reach 2A (see below), a new outfall is proposed about 900' south of existing Outfall 943 to convey the rerouted 100-year storm event flows to Boulder Creek. Reach 1 for Outfall 943A extends from Coal Creek east across County Line Road and then south along the east side of County Line Road. The recommended plan for Reach 1 includes creation of a channel with 100-year capacity from Boulder Creek to County Line Road. Four 14'x4' RCBC are proposed for the County Line Road crossing to convey the 1,698 cfs. The recommended plan also includes preservation and stabilization of the roadside ditch to the south.

Runoff that remains tributary to the original Outfall 943 is only from a small tributary area located north of new Outfall 943A. The roadside swale and the existing 30" RCP culvert across County Line Road just south of Highway 52 should be preserved and stabilized.

Outfall 944

Reach 1 (Figure D-4)

Proposed Improvement Categories:

Major Drainageway Preservation

Reach 1 for Outfall 944 extends from Boulder Creek south to Highway 52, west of County Line Road. With the new outfalls proposed to the south that divert runoff directly to Boulder Creek, the runoff to Outfall 944 is reduced to be only from the tributary area located northwest of the intersection of County Line Road and Highway 52. The recommended plan for this reach is to preserve and stabilize the major drainageway.

Outfall 950

Reach 1 (Figure D-4)

Proposed Improvement Categories:

100-year Conveyance
Channel Stabilization

Reach 1 for Outfall 950 extends from Boulder Creek south to Highway 52. The lower portion of this reach is within the Boulder Creek floodplain and is zoned for open space uses. With the combination of runoff from Outfall 950 and rerouted Outfall 951 (see Outfall 951 Reach 1A below), the recommended plan for Reach 1 is to preserve and stabilize the existing drainageway as necessary to prevent erosion. An improved channel is proposed parallel to the decommissioned railroad tracks in the upper portion of this reach to provide 100-year conveyance and to prevent flooding of a gravel stockpile area and introduction of excessive sediment into Boulder Creek.

Reach 2 (Figure D-4)

Proposed Improvement Categories:

100-year Detention
Major Drainageway Preservation
Culvert Improvements

Reach 2 extends from the decommissioned railroad tracks to the south side of Highway 52, then west along the south side of the highway. The recommended plan is to utilize the capacity of existing culverts across Highway 52 to avoid construction of potentially difficult new crossings. In order to use the existing culverts, runoff must be reduced. After discussions with the Town, a new tributary path (Reach 2A) is proposed to convey runoff west to County Line Road. Despite rerouting the majority of flow west, a 100-year detention pond (flood control only) is proposed south of Highway 52 to reduce flows to the capacity of the existing 48" RCP (43 cfs).

In addition, an existing 42" CMP located approximately 1,040' east of County Line Road also reduces the runoff to the new flood-control pond by directing flow north across Highway 52 and ultimately to Outfall 950. The major drainageway for this reach should also be preserved and stabilized.

Reach 2A (Figure D-4)

Proposed Improvement Categories:

100-year Conveyance

Proposed Reach 2A extends from County Line Road east to the western edge of the future Spring Hill (Andalusia) development. The recommended plan is to create a new channel to redirect the major drainageway to flow to County Line Road instead of Highway 52. Reach 2A then combines with Reach 1 of Outfall 943A.

Reach 3 (Figure D-4 and D-3)

Proposed Improvement Categories:

100-year Conveyance
Major Drainageway Preservation
Culvert Improvements

Reach 3 for Outfall 950 extends from the western edge of the future Spring Hill (Andalusia) development southeast to approximately 200 feet north of WCR 12, east of WCR 3. The recommended plan for this reach is to preserve the major drainageway where there is 100-year capacity and provide an improved channel where 100-year capacity is not available or where elevations are limited between proposed culverts. The proposed 100-year conveyance channel was assumed to have a 0.25% slope, which will require drop structures to stabilize the grades. A series of large culverts are proposed to convey the 100-year storm event across the Boulder and Weld County Ditch, WCR 3, and the Sullivan Ditch (double 8'x8' RCBC, double 10'x8' RCBC, and double 8'x8' RCBC, respectively).

Reach 4 (Figure D-3)

Proposed Improvement Categories:

100-year Detention
100-year Conveyance
Culvert Improvements

Reach 4 extends from approximately 200 feet north of WCR 12 south along the east side of WCR 3 to WCR 10 1/2. The western limits of the tributary basin were altered based on the delineation in the *Phase III Drainage Report for Morgan Hill Filing No. 1* by Hurst and Associates (May 2018). An offline detention pond based on Pond A that is planned for the Morgan Hill development is proposed at the southwest corner of WCR 3 and WCR 12. This 14.1 acre-feet pond is proposed to reduce the tributary peak flows from 288 cfs to 156 cfs. Based on the Morgan Hill report and the 2007 OSP, WCR 3 is proposed to be realigned slightly to the west to allow space for channel improvements. The existing drainageway is undersized and is proposed to be improved to provide 100-year conveyance. In order to construct reasonably sized culverts across the Rue de Trust roadway and the Cottonwood Extension Ditch, the invert of the channel is proposed to be lowered along this reach when it is improved. A drop structure(s) is proposed in the upstream portion of this reach, or in Reach 5, to achieve the channel lowering. Triple 12'x4' RCBC and double 8'x6' RCBC are proposed to provide 100-year capacity culverts at WCR 12 and Rue de Trust/ Cottonwood Extension Ditch, respectively.

Reach 5 (Figure D-3)

Proposed Improvement Categories:

Major Drainageway Preservation

Reach 5 extends from WCR 10 1/2 southeast to a bridge across the RTD embankment east of WCR 3. The recommended plan for this reach involves preserving the major drainageway.

Reach 6 (Figure D-3 and D-2)

Improvement Categories:

No Improvements

Reach 6 extends from a bridge across the RTD embankment east of WCR 3 to the northwest corner of Erie Parkway and WCR 5. The major drainageway was previously improved along this reach as part of the Colliers Hill development. An improved channel and a 68 acre-feet detention pond were constructed for this development. Therefore, no additional improvements are proposed for this reach.

Reach 7 (Figure D-2)

Proposed Improvement Categories:

100-year Detention
Culvert Improvements

Reach 7 extends from the northwest corner of Erie Parkway and WCR 5 to the south across Erie Parkway, then to the east across WCR 5. The goal for this reach involves providing detention to reduce developed-condition flows to the capacity of the existing 7'x5' RCBC across Erie Parkway (about 368 cfs). Per the *Phase II Drainage Report for Westerly* by Matrix Design Group (June 2019), it is planned to provide a 100-year detention pond (D1 - 35.8 acre-feet) located southeast of Erie Parkway/WCR 5 to reduce the developed condition flow from 818 cfs to 290 cfs for the Westerly development. A 6'x4' RCBC is proposed across WCR 5 to convey the 290 cfs west. A detention pond at the southwest corner of the intersection is proposed as part of the Erie Highlands development (D2). This 9.9 acre-feet pond reduces developed condition runoff from 270 cfs to 107 cfs, as indicated by the *Phase III Drainage Report for Erie Highlands Planning Areas 8, 9, and 10* by Core Consultants (August 2019). The combined discharges from these two ponds will be about 368 cfs to meet the capacity of the existing 7'x5' RCBC.

Outfall 951

Reach 1 (Figure D-4 and D-8)

Proposed Improvement Categories:

Major Drainageway Preservation
Culvert Improvements

Reach 1 for Outfall 951 extends from WCR 16 1/2 south along the east side of WCR 3 1/4 to the decommissioned railroad tracks. There is limited capacity in this roadside ditch and space is restricted for an improved channel, so the recommended plan is to reroute the main outfall tributary path to the west at the junction with the decommissioned railroad tracks (Reach 1A – see below). The Reach 1 drainageway is to be preserved and the existing 36" RCP across WCR 16 1/2 is proposed to be replaced with a 60" RCP.

Reach 1A (Figure D-4)

Proposed Improvement Categories:

100-year Conveyance
Culvert Improvements

The purpose of Reach 1A is to reroute runoff from Outfall 951 to Outfall 950 due to limited capacity along Outfall 951 Reach 1. The recommended plan for Reach 1A is to install new 4-14'x4' RCBC across WCR 3 1/4 and create a new channel with 100-year capacity. Additionally, a new 48" RCP culvert across the decommissioned railroad track is proposed to reroute runoff from the area between WCR 3 1/4 and the railroad embankment to the new channel.

Reach 2 (Figure D-8)

Proposed Improvement Categories:

Major Drainageway Preservation

Reach 2 extends from WCR 3 1/4 southeast to a low spot west of WCR 5 approximately 1,300' north of Highway 52. The low area is north of the Boulder and Weld County Ditch. The recommended plan includes preserving and stabilizing the major drainageway along this reach.

Reach 3 (Figure D-8)

Proposed Improvement Categories:

100-year Conveyance
Major Drainageway Preservation
Culvert Improvements

Reach 3 extends from the low area mentioned in Reach 2 south through the Carmacar et al development to WCR 12. The recommended plan for this reach is to preserve the major drainageway through the development, provide new culverts at several crossings to provide 100-year capacity, and improve the drainageway to positively slope between the culverts. The upstream end of Reach 2 has previously been filled in to construct a dirt access road with only a small culvert crossing and it appears that flows spread out to spill across the road. Four 10'x5' RCBC are proposed across the access road to make a direct connection to Reach 2. Triple 7'x4' RCBC culverts are proposed across the Boulder and Weld County Ditch and a 12'x6' across Highway 52. An 8'x5' RCBC is proposed across the Lower Boulder Ditch located south of Highway 52.

Reach 4 (Figure D-8)

Proposed Improvement Categories:

100-year Conveyance
Culvert Improvements

Reach 4 extends from the low area mentioned in Reach 2 southeast to Highway 52 approximately 1,800' east of WCR 5. Flows tributary to this reach include detention pond discharges from the Wyndham Hill development in Frederick, Colorado. The recommended plan is to create an improved channel from Highway 52 (outlet from Reach 5) to the confluence with Reach 3. Channel improvements are needed to positively slope between the new 3-11'x5' and 10'x8' RCBC culverts across WCR 5 and the Lower Boulder Ditch, respectively.

Reach 5 (Figure D-8)

Proposed Improvement Categories:

100-year Detention
100-year Conveyance
Culvert Improvements

Reach 5 extends along the south side of Highway 52 west to WCR 5. Part of the recommended plan for the upstream end of Outfall 951 is to reroute the major drainageway to the topographic low point on the south side of Highway 52 which is approximately 1,800' east of WCR 5 (i.e., the downstream end of Reach 5). A 10'x8' RCBC culvert across Highway 52 is proposed to replace the existing 24" RCP culvert to convey the increased 100-year runoff across Highway 52. Additionally, an offline 100-year detention pond (21.4 acre-feet) is proposed to reduce developed condition flows (610 cfs) to existing rates for the tributary area (301 cfs).

Reach 6 (Figure D-7)

Proposed Improvement Categories:

100-year Conveyance
Culvert Improvements

Reach 6 extends from Highway 52 south to WCR 12 on the east side of WCR 5. A new channel with 100-year conveyance is proposed to convey runoff along the east side of WCR 5 to Highway 52 to reroute flow that currently drains to the undersized drainageway through the Carmacar et al development area (i.e., Reach 3). Rerouting flow to Reach 6 will significantly reduce the flow to Reach 3. The Reach 6 channel will require regrading to cut through existing subbasin divides so runoff can positively flow to the southeast corner of WCR 5 and WCR 12. An 8'x5' RCBC is proposed to convey the 100-year runoff across the Cottonwood Extension Ditch.

Reach 7 (Figure D-7)

Proposed Improvement Categories:

Major Drainageway Preservation
Culvert Improvements

Reach 7 extends from WCR 12 south to the RTD embankment east of WCR 5. The recommended plan for this reach is to preserve and stabilize the major drainageway through the Scotts Acres rural residential area and to replace the existing 18" RCP culvert across WCR 12 with an 8'x5' RCBC to provide 100-year capacity.

Outfall 953

Reach 1 (Figure D-8)

Proposed Improvement Categories:

Major Drainageway Preservation
Culvert Improvements

Reach 1 for Outfall 953 extends southeast from the intersection of WCR 16 1/2 and the decommissioned railroad tracks. The recommended plan for this reach is to preserve the major drainageway and provide a new 8'x6' RCBC culvert across WCR 16 1/2 to supplement the existing 48" RCP culverts at this location. This new culvert is sized for the remaining 100-year storm event flow (446 cfs) that does not flow through the existing 48" RCP culverts across the railroad tracks.

Outfall 955

Reach 1 (Figure D-8)

Proposed Improvement Categories:

Major Drainageway Improvements

Reach 1 for Outfall 955 extends southeast from the outfall east of the intersection of WCR 16 1/2 and WCR 5. The recommended plan for this reach is to preserve the major drainageway.

Outfall 935 and Outfall 939

Reach 1 (Figure D-9)

Proposed Improvement Categories:

No Improvements

Both Outfalls 935 and 939 are located west of Boulder Creek south of WCR 16 1/2 near Panama Reservoir

No. 1. Although these outfalls each have tributary areas greater than 130 acres, the future land uses will remain as agricultural, open space, and rural residential and therefore no improvements are proposed.

GODDING HOLLOW TRIBUTARIES

Outfall 975

Reach 1 (Figure D-7)

Proposed Improvement Categories:

100-year Detention
100-year Conveyance
Culvert Improvements

Reach 1 for Outfall 975 extends from Highway 52 to WCR 12 east of WCR 7. The recommended plan for this reach is to provide an improved channel to convey the 100-year storm event runoff. A 100-year detention pond (55.8 acre-feet) is proposed to reduce developed condition runoff from 1,356 cfs to the existing 100-year flow of 1,165 cfs. Water quality must be included offline since this pond was sized for flood control only. Three 12'x4' RCBC are proposed to convey this runoff north across Highway 52 to the outfall.

Reach 2 (Figure D-7)

Proposed Improvement Categories:

100-year Detention
100-year Conveyance
Culvert Improvements

Reach 2 for Outfall 975 extends southwest from WCR 12 to WCR 7. An improved channel is proposed to convey runoff for the 100-year storm event from WCR 7 to WCR 12. An offline 100-year detention pond (28.8 acre-feet) is proposed south of WCR 12 to reduce developed condition runoff from 594 cfs to the existing 100-year flow of 315 cfs. The outflow from this detention pond combines with the channel runoff and flows north across WCR 12 via proposed double 8'x6' RCBC to convey 100-year runoff to Reach 1.

Reach 3 (Figure D-7 and D-6)

Proposed Improvement Categories:

100-year Conveyance
Culvert Improvements

The recommended plan for Reach 3 is to improve the channel from WCR 7 to the RTD embankment through the Scotts Acres rural residential area to convey the 100-year storm event runoff. At WCR 7, a 12'x6' RCBC is proposed to replace the 18" RCP culvert to convey 100-year runoff to Reach 2.

Reach 4 (Figure D-6)

Proposed Improvement Categories:

100-year Conveyance
Culvert Improvements

The recommended plan for Reach 4 is to have an improved channel from the RTD embankment to WCR 10 that will allow for positive slope between proposed culverts. A new 12'x6' RCBC is proposed to convey 100-year runoff across the RTD embankment and abandoned railroad spur.

Reach 5 (Figure D-6)

Proposed Improvement Categories:

100-year Detention
100-year Conveyance
Culvert Improvements

A defined drainageway with adequate capacity does not exist through the Scotts Acres rural residential area to accept developed or existing condition flows from the south. With upstream proposed improvements, the recommended plan for Reach 5 is to provide a new 100-year capacity channel along the south side of WCR 10. A 6.0 acre-feet offline 100-year detention pond located west of the proposed channel is proposed to reduce developed condition runoff to existing conditions (135 cfs to 82 cfs). A 10'x6' RCBC is proposed to replace the existing 18" RCP to convey the 100-year runoff north across WCR 10.

Reach 6 (Figure D-6)

Proposed Improvement Categories:

100-year Detention
100-year Conveyance

As indicated for Reach 5, a defined drainageway with adequate capacity does not exist through the Scotts Acres rural residential area to accept developed or existing condition flows from the south. The recommended plan for Reach 6 is to provide a 16.7 acre-feet 100-year detention pond to reduce developed condition flow from 479 cfs to the existing flow of 254 cfs. This reduced flow is then proposed to be conveyed north in a new channel along the west side of existing development to WCR 10 (Reach 5).

Reach 7 (Figure D-7)

Proposed Improvement Categories:

100-year Detention
Major Drainageway Preservation
Culvert Improvements

Reach 7 for Outfall 975 extends from the outfall west along the north side of Highway 52 and then to the southwest corner of the Highway 52 and WCR 7 intersection. The recommended plan for this reach is to provide a 17.7 acre-feet detention pond southwest of the intersection to reduced developed condition flow from 302 cfs to the existing flow of 145 cfs. This reduced flow is then planned to be conveyed northeast across the intersection via double 5'x3' RCBC. The major drainageway downstream of the culverts is proposed to be stabilized and preserved.

Outfall 973

Reach 1 (Figure D-7)

Proposed Improvement Categories:

Major Drainageway Preservation

The tributary area to Outfall 973 is approximately 137 acres at the outfall location near I-25. There is not a defined major drainageway that meets the analysis criteria (greater than 130 acres), however, natural drainage patterns within the tributary basins should be maintained and preserved with future development.

Outfall 972

Reach 1 (Figure D-7)

Proposed Improvement Categories:

Major Drainageway Preservation

The recommended plan for this reach is to preserve and stabilize the drainageway along the west side of I-25. The existing 8'x5' RCBC across I-25 and WCR 12 has adequate capacity to convey the developed 100-year flow east to the outfall. Even though this culvert has sufficient capacity, 100-year detention storage will still be required for future development.

Outfall 971

Reach 1 (Figure D-6)

Proposed Improvement Categories:

100-year Conveyance

The recommended plan for this reach is to provide an improved channel along the drainageway from I-25 southwest to a dirt access road. Regrading the slope of the drainageway is required to connect the existing double 14'x6' RCBC across I-25 to the proposed culverts in Reach 2 (see below). The existing double 14'x6' RCBC across I-25 have adequate capacity to convey the developed 100-year flow northeast to the outfall. Even though this culvert has sufficient capacity, 100-year detention storage will still be required for future development.

Reach 2 (Figure D-6)

Proposed Improvement Categories:

100-year Conveyance

Culvert Improvements

The recommended plan for this reach is to provide an improved channel from a dirt access road southwest to WCR 10. A 14'x4' RCBC is proposed to replace the existing 36" RCP culvert across the dirt road to convey the 100-year storm event to Reach 1. A 9'x5' RCBC is proposed to replace the existing 36" RCP culvert across WCR 10 to convey the 100-year storm event.

Reach 3 (Figure D-6)

Proposed Improvement Categories:

100-year Detention

Major Drainageway Preservation

The recommended plan for this reach is to preserve and stabilize the major drainageway from WCR 10 southwest to the RTD embankment. The recommended plan also includes a 46.0 acre-feet 100-year detention pond to reduce the developed condition runoff at WCR 10 from 945 cfs to the existing flow of 414 cfs.

Outfall 970

Reach 1 (Figure D-6)

Proposed Improvement Categories:

100-year Detention

Major Drainageway Preservation

Reach 1 for Outfall 970 is located north of Erie Parkway and west of I-25. The recommended plan for this reach is to preserve and stabilize the major drainageway and provide 100-year detention to reduce the developed condition flows at the outfall to existing rates. The 100-year detention has 59.6 acre-feet of storage volume and reduces developed condition flows from 1,250 cfs to 588 cfs and ultimately discharges northeast across I-25 through existing double 10'x5' RCBC to Outfall 970.

LITTLE DRY CREEK TRIBUTARIES

Outfall 962

Reach 1 (Figure D-5)

Proposed Improvement Categories:

100-year Detention

100-year Conveyance

Culvert Improvements

Reach 1 for Outfall 962 extends southwest from I-25 to the Stanley Ditch north of WCR 6. The recommended plan for this reach involves detaining runoff to release at the capacity of the existing 72" RCP across I-25 (267 cfs). The 162.2 acre-feet pond is proposed to reduce developed flows from 1,466 cfs to the existing capacity of 267 cfs. An improved channel is also proposed to connect the pond to the inverts of the proposed culverts under the Stanley Ditch in Reaches 2 and 5 (see below). The existing frontage road will be inundated by the pond and relocation should be considered.

Reach 2 (Figure D-5)

Proposed Improvement Categories:

100-year Detention

100-year Conveyance

Major Drainageway Preservation

Culvert Improvements

Reach 2 extends from the Stanley Ditch west to WCR 7. The recommended plan for this reach includes preserving and stabilizing the major drainageway. An improved channel is proposed to extend from WCR approximately 335' east to allow for positive slope from a proposed culvert in Reach 3 (Culvert C3 – see below). At the downstream end of Reach 2, a 25.7 acre-feet 100-year detention pond is proposed to reduce developed condition flows upstream of Stanley Ditch from 889 cfs to 852 cfs. Double 10'x4' RCBC are proposed to replace the existing 48" RCP culvert across the Stanley Ditch to provide 100-year capacity. Downstream of this proposed culvert, runoff combines with runoff from Reach 5.

Reach 3 (Figure D-5)

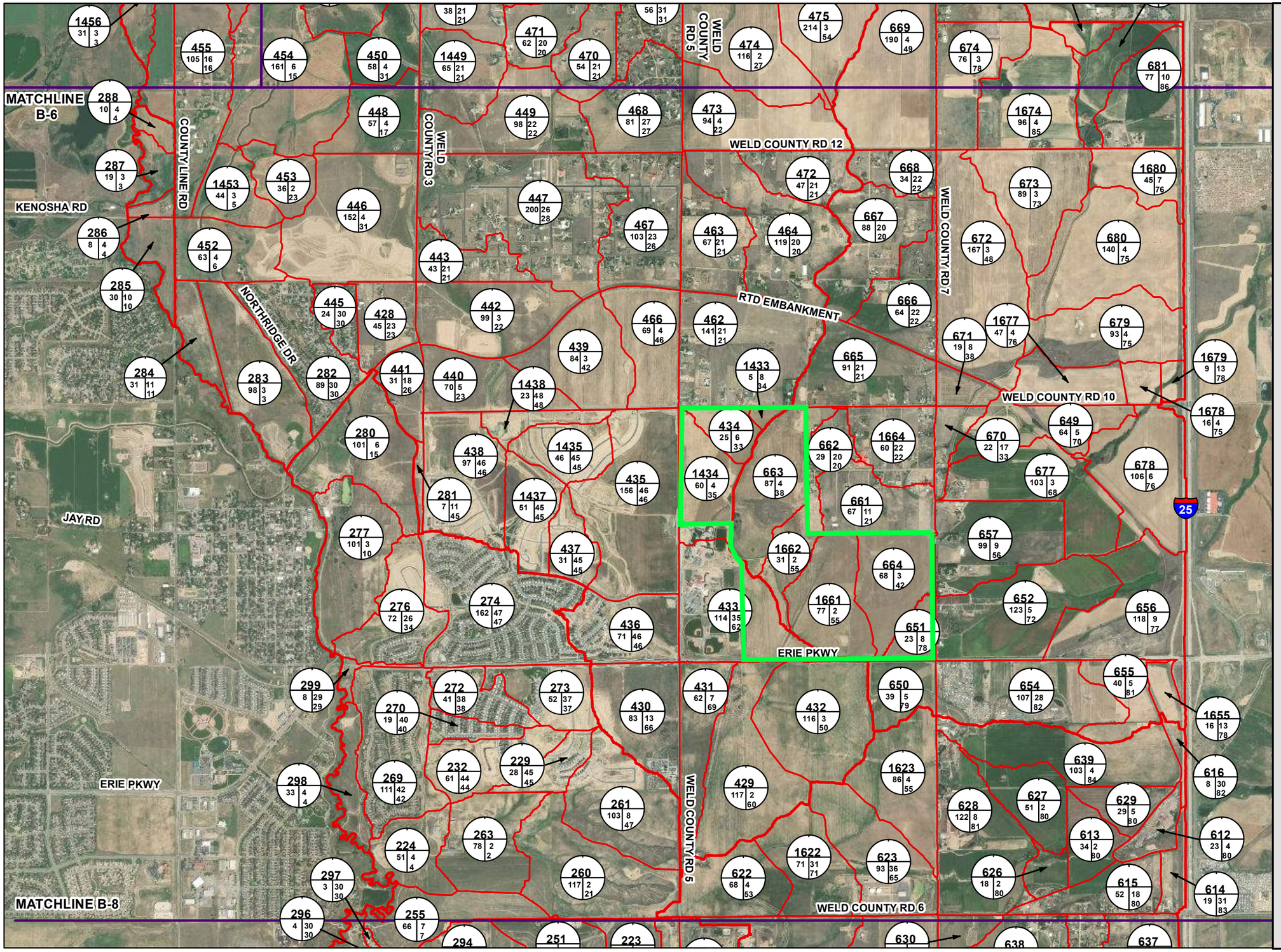
Proposed Improvement Categories:

100-year Detention

100-year Conveyance

Culvert Improvements

Reach 3 is located west of WCR 7 and north of an oil and gas production site. The recommended plan for this reach includes creating an improved channel north of the production facility to provide 100-year capacity. A 27.6 acre-feet 100-year detention pond is proposed to reduce the developed condition flows at WCR 7 from 915 cfs to approximately existing 723 cfs. A 10'x5' RCBC (Culvert C3) is proposed to replace the existing 36" RCP culvert across WCR 7 to provide capacity for the 100-year storm event.

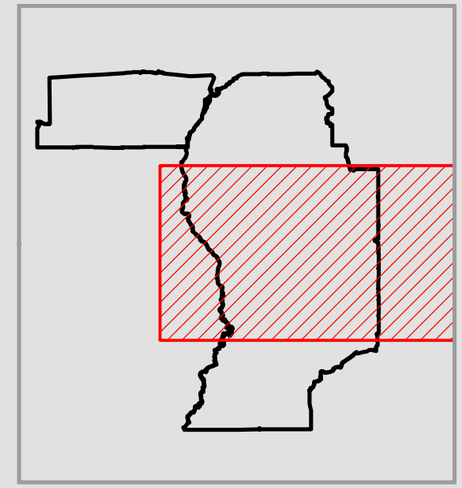


Legend

- Study Area Boundary
- Subbasin Boundary

XXX — Subbasin ID
XX X — % Impervious (Existing Land Use)
X — % Impervious (Future Land Use)
Area (Acres)

KEY MAP



N W E S

1 inch = 2,000 feet
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)

SUBBASIN MAP

FIGURE B-7

LEGEND

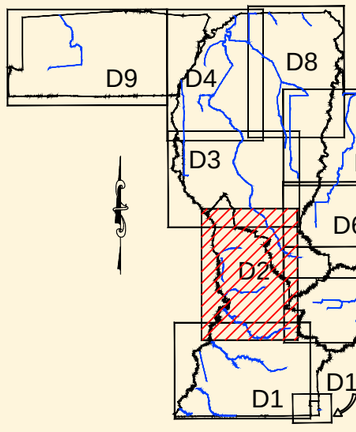
- ERIE MAJOR WATERSHED BOUNDARY
- WATERSHED BOUNDARY
- EXISTING DETENTION POND
- OUTFALL TRIBUTARY ALIGNMENT (> 130 ACRES)
- 915 — TRIBUTARY OUTFALL

ALTERNATIVES

- PROPOSED DETENTION POND
- PROPOSED CHANNEL (LABELED "H")
- MAJOR DRAINAGE PRESERVATION
- CULVERT IMPROVEMENTS (LABELED "C")

NOTES:

- UNLESS OTHERWISE SPECIFIED, ALL VOLUMES AND FLOW ARE 100-YEAR DEVELOPED CONDITION.
- PROPOSED DETENTION FACILITIES MAY BE DIVIDED INTO MULTIPLE DETENTION FACILITIES PROVIDED THE ALTERNATIVE OFFERS THE EQUIVALENT INTENT OF THE PLAN INCLUDING HYDRAULIC CAPACITY AND WATER QUALITY FUNCTIONS.
- ELEVATIONS SHOWN ARE ON NAVD88 VERTICAL DATUM
- TOWN GIS DATA AS OF DECEMBER 2017



KEY MAP

0 1000' 2000'

1" = 1000'

SITE BOUNDARY

OUTFALL 950 - REACH 6
6. NO IMPROVEMENTS

COLLIERS HILL

REACH 6

EXISTING 7'X5' RCBC CAPACITY LIMITS UPSTREAM RELEASE

WESTERLY

D1

D2

C1

REACH 7

OUTFALL 950 - REACH 7
1. 100 -YR DETENTION D-1 (OVERDETAIN)
V= 35.8 AC-FT
Q_{IN}= 818 CFS, Q_{OUT}= 290 CFS
1. 100-YR DETENTION D-2
V = 9.9 AC-FT
Q_{IN} = 270 CFS, Q_{OUT} = 107 CFS
5. CULVERT IMPROVEMENTS
C1 - Q= 290 CFS : 6'X4' RCBC
U/S INV = 5145.5, S = 1.33%

WELD CR. 5

WELD CR. 6

OUTFALL 919 - REACH 1
4. MAJOR DRAINAGEWAY PRESERVATION
5. CULVERT IMPROVEMENTS
C1 - Q = 726 CFS : 2-10'X8' RCBC
U/S INV = 5047.08, S = 0.12%
C2 - Q = 442 CFS :10'X9' RCBC
U/S INV = 5098.08, S = 0.10%
C3 - Q = 366 CFS :8'X6' RCBC
U/S INV = 5116.20, S = 0.36%
C4 - Q = 233 CFS : 42" RCP
U/S INV = 5157.35, S = 7.83%

C4

C3

C2

REACH 1

ERIE HIGHLANDS

ERIE PKWY.

OUTFALL 921 - REACH 1
1. 100-YR DETENTION
V = 13.5 AC-FT
Q_{IN} = 475 CFS, Q_{OUT} = 319 CFS
4. MAJOR DRAINAGEWAY PRESERVATION

REACH 1

OUTFALL 919 - REACH 2
4. MAJOR DRAINAGEWAY PRESERVATION

REACH 2

C1

GRANDVIEW

OUTFALL 923 - REACH 1
6. NO IMPROVEMENTS

REACH 1

VISTA POINTE

OUTFALL 925 - REACH 1
6. NO IMPROVEMENTS

REACH 1

COTTONWOOD EXTENSION DITCH

COAL CREEK

925

923

921

919

TOWN OF ERIE	TOWN OF ERIE OUTFALL SYSTEMS PLAN (EAST OF COAL CREEK)	RECOMMENDED PLANS	JANUARY 2020	MERRICK 2480 W. 26th Ave. Suite B225 Denver, CO 80211 T303.964.3333 F303.964.3355	FIGURE D2

LEGEND

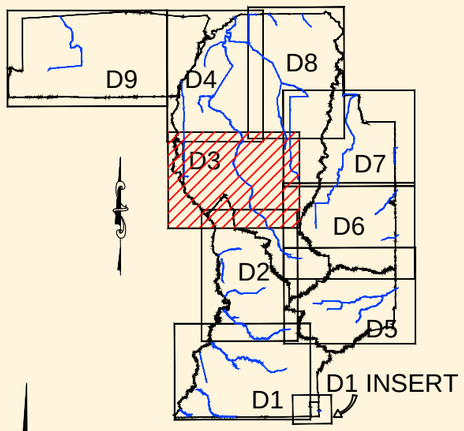
- ERIE MAJOR WATERSHED BOUNDARY
- WATERSHED BOUNDARY
- EXISTING DETENTION POND
- OUTFALL TRIBUTARY ALIGNMENT (> 130 ACRES)
- 915 — TRIBUTARY OUTFALL

ALTERNATIVES

- PROPOSED DETENTION POND
- PROPOSED CHANNEL (LABELED "H")
- MAJOR DRAINAGE PRESERVATION
- CULVERT IMPROVEMENTS (LABELED "C")

NOTES:

- UNLESS OTHERWISE SPECIFIED, ALL VOLUMES AND FLOW ARE 100-YEAR DEVELOPED CONDITION.
- PROPOSED DETENTION FACILITIES MAY BE DIVIDED INTO MULTIPLE DETENTION FACILITIES PROVIDED THE ALTERNATIVE OFFERS THE EQUIVALENT INTENT OF THE PLAN INCLUDING HYDRAULIC CAPACITY AND WATER QUALITY FUNCTIONS.
- ELEVATIONS SHOWN ARE ON NAVD88 VERTICAL DATUM
- TOWN GIS DATA AS OF DECEMBER 2017



KEY MAP

0 1000' 2000'

1" = 1000'

OUTFALL 287A - REACH 1
NEW OUTFALL - FLOW REDIRECTED
1. 100-YR DETENTION - MORGAN HILL POND B
   V= 3.9 ACFT
   Q_{IN} = 82 CFS, Q_{OUT} = 40 CFS
3. 100-YR CONVEYANCE
   H1-Q =196 CFS
   H2-Q = 96 CFS
5. CULVERT IMPROVEMENTS
   Q= 196 CFS : 8'X3' RCBC WEST
   U/S INV = 4977.6, S = 0.5%

OUTFALL 287A - REACH 2
4. MAJOR DRAINAGEWAY PRESERVATION

OUTFALL 930A - REACH 1
NEW OUTFALL - FLOW REDIRECTED
3. 100-YR CONVEYANCE
   Q= 292 CFS
4. MAJOR DRAINAGEWAY PRESERVATION
5. CULVERT IMPROVEMENTS
   Q= 292 CFS : 7'X5' RCBC
   U/S INV = 4989.26, S = 1.05%
   WEST UNDER COUNTY LINE RD
   SPLIT FLOW - 54 CFS NORTH

OUTFALL 950 - REACH 4
1. 100-YR DETENTION
   V= 14.1 ACFT
   Q_{IN} = 288 CFS, Q_{OUT} = 156 CFS
3. 100-YR CONVEYANCE
   H1-Q =1,410 CFS
   H2-Q = 1,092 CFS
5. CULVERT IMPROVEMENTS
   C1 - Q = 1,410 CFS : 3 - 12'X4' RCB
   U/S INV = 5011.87, S = 0.5%
   C2 - Q = 1,092 CFS : 2 - 8'X6' RCB
   U/S INV = 5026.52, S = 0.5%

OUTFALL 951 - REACH 5
4. MAJOR DRAINAGEWAY PRESERVATION

OUTFALL 951 - REACH 6
6. NO IMROVEMENTS

287A
930A
REACH 1
REACH 2
H1
H2
BOULDER & WELD COUNTY DITCH
COTTONWOOD EXTENSION DITCH
SULLIVAN DITCH
MORGAN HILL
WCR 3 TO BE REALIGNED
REDEFINED BASIN BOUNDARY PER MORGAN HILL FILING 1 DRAINAGE REPORT
WELD CR. 10 1/2
DROP STRUCTURE(S) TO LOWER CHANNEL
C1
C2
REACH 3
REACH 4
REACH 5
REACH 6
REACH 7
H3
WELD CR. 12
PARKLAND ESTATES
WELD CR. 3
WELD CR. 5
RTD EMBANKMENT
WELD CR. 10
COUNTY LINE RD.
COAL CREEK
SITE BOUNDARY

TOWN OF ERIE	TOWN OF ERIE OUTFALL SYSTEMS PLAN (EAST OF COAL CREEK)	RECOMMENDED PLANS	JANUARY 2020	MERRICK 2480 W. 26th Ave. Suite B225 Denver, CO 80211 T303.964.3333 F303.964.3355	FIGURE D3

LEGEND

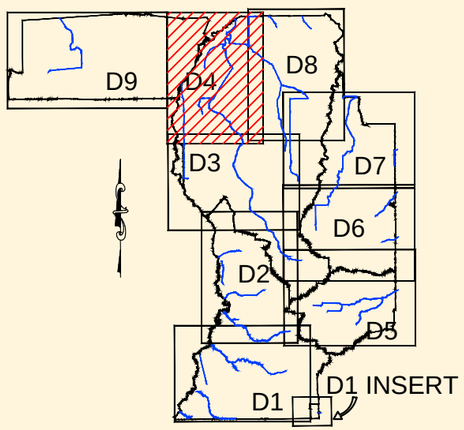
- ERIE MAJOR WATERSHED BOUNDARY
- WATERSHED BOUNDARY
- EXISTING DETENTION POND
- OUTFALL TRIBUTARY ALIGNMENT (> 130 ACRES)
- 915 TRIBUTARY OUTFALL

ALTERNATIVES

- PROPOSED DETENTION POND
- PROPOSED CHANNEL (LABELED "H")
- MAJOR DRAINAGE PRESERVATION
- CULVERT IMPROVEMENTS (LABELED "C")

NOTES:

- UNLESS OTHERWISE SPECIFIED, ALL VOLUMES AND FLOW ARE 100-YEAR DEVELOPED CONDITION.
- PROPOSED DETENTION FACILITIES MAY BE DIVIDED INTO MULTIPLE DETENTION FACILITIES PROVIDED THE ALTERNATIVE OFFERS THE EQUIVALENT INTENT OF THE PLAN INCLUDING HYDRAULIC CAPACITY AND WATER QUALITY FUNCTIONS.
- ELEVATIONS SHOWN ARE ON NAVD88 VERTICAL DATUM
- TOWN GIS DATA AS OF DECEMBER 2017



KEY MAP

0 1000' 2000'

1" = 1000'

OUTFALL 951 - REACH 1
4. MAJOR DRAINAGEWAY PRESERVATION
5. CULVERT IMPROVEMENTS
Q = 115 CFS : 60" RCP
U/S INV = 4911.14, S = 0.5%

OUTFALL 951 - REACH 1A
3. 100-YR CONVEYANCE
Q= 2,152 CFS
5. CULVERT IMPROVEMENTS
C1 - Q = 2,125 CFS : 4-14'X4' RCBC
U/S INV = 4929.94, S = 0.5%
C2 - Q = 77 CFS : 48" RCP
U/S INV = 4930.98, S = 0.73%

OUTFALL 950 - REACH 1
3. 100-YR CONVEYANCE
H1-Q = 474 CFS
4. MAJOR DRAINAGEWAY PRESERVATION

OUTFALL 950 - REACH 2
1. 100-YR DETENTION (NO WQ)
V = 23.8 ACFT
Q_{IN} = 311 CFS, Q_{OUT} = 43 CFS
4. MAJOR DRAINAGEWAY PRESERVATION
5. CULVERT IMPROVEMENTS (FLOW REDUCED TO EXISTING CAPACITY)
C1 - Q = 43 CFS : 48" RCP (EXISTING)
C2 - Q = 30 CFS : 42" CMP (EXISTING)

OUTFALL 950 - REACH 3
3. 100-YR CONVEYANCE
H1 - Q = 1,551 CFS (WITH DROPS)
H2 - Q = 1,533 CFS (WITH DROPS)
4. MAJOR DRAINAGEWAY PRESERVATION
5. CULVERT IMPROVEMENTS
C1 - Q = 1,532 CFS : 2 - 8'X8' RCBC
U/S INV = 4968.41, S = 0.5%
C2 - Q = 1,482 CFS : 2 - 10'X8' RCBC
U/S INV = 4986.79, S = 0.37%
C3 - Q = 1,482 CFS : 2 - 8'X8' RCBC
U/S INV = 4988.33, S = 0.5%
C1 - Q = 2,050 CFS : 4-10'X5' RCBC
U/S INV = 4964.54, S = 0.4%
C2 - Q = 680 CFS : 3-7'X4' RCBC
U/S INV = 4966.09, S = 0.4%
C3 - Q = 680 CFS : 12'X6' RCBC
U/S INV = 4978.77, S = 1.07%
C4 - Q = 469 CFS : 8'X5' RCBC
U/S INV = 4985.62, S = 0.76%

OUTFALL 950 - REACH 2A
3. 100-YR CONVEYANCE
Q = 1,657 CFS

OUTFALL 943A - REACH 1 NEW OUTFALL (REDIRECTED FLOW)
3. 100-YR CONVEYANCE
Q = 1,698 CFS
4. MAJOR DRAINAGEWAY PRESERVATION
5. CULVERT IMPROVEMENTS
Q = 1,698 CFS : 4 - 14'X4' RCBC
U/S INV = 4956.84, S = 0.5%

OUTFALL 944 - REACH 1
4. MAJOR DRAINAGEWAY PRESERVATION

951 950 935 944 943 943A

REACH 1 REACH 1A REACH 2 REACH 2A REACH 3

C1 C2 C3 H1 H2

WELD CR. 3 1/4 WELD CR. 3 WELD CR. 16 1/2

HWY 52 COUNTY LINE RD

DECOMMISSIONED RAILROAD BOULDER CREEK COAL CREEK SULLIVAN DITCH BOULDER & WELD COUNTY DITCH SPRING HILL

TOWN OF ERIE	TOWN OF ERIE OUTFALL SYSTEMS PLAN (EAST OF COAL CREEK)	RECOMMENDED PLANS	JANUARY 2020	MERRICK 2480 W. 26th Ave. Suite B225 Denver, CO 80211 T303.964.3333 F303.964.3355	FIGURE D4

LEGEND

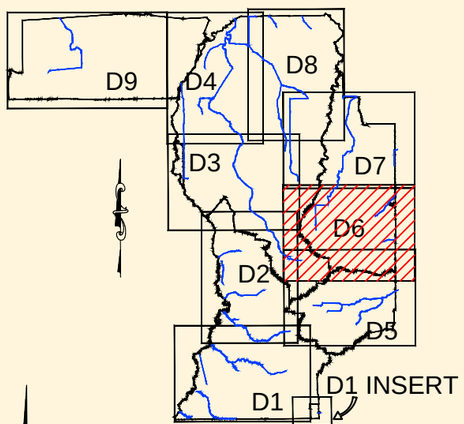
- ERIE MAJOR WATERSHED BOUNDARY
- WATERSHED BOUNDARY
- EXISTING DETENTION POND
- OUTFALL TRIBUTARY ALIGNMENT (> 130 ACRES)
- 915 — TRIBUTARY OUTFALL

ALTERNATIVES

- PROPOSED DETENTION POND
- PROPOSED CHANNEL (LABELED "H")
- MAJOR DRAINAGE PRESERVATION
- CULVERT IMPROVEMENTS (LABELED "C")

NOTES:

- UNLESS OTHERWISE SPECIFIED, ALL VOLUMES AND FLOW ARE 100-YEAR DEVELOPED CONDITION.
- PROPOSED DETENTION FACILITIES MAY BE DIVIDED INTO MULTIPLE DETENTION FACILITIES PROVIDED THE ALTERNATIVE OFFERS THE EQUIVALENT INTENT OF THE PLAN INCLUDING HYDRAULIC CAPACITY AND WATER QUALITY FUNCTIONS.
- ELEVATIONS SHOWN ARE ON NAVD88 VERTICAL DATUM
- TOWN GIS DATA AS OF DECEMBER 2017



KEY MAP

0 1000' 2000'

1" = 1000'

OUTFALL 975 - REACH 5
1. 100-YR DETENTION
   V = 6.0 AC-FT
   Q_{IN} = 135 CFS, Q_{OUT} = 82 CFS
3. 100-YR CONVEYANCE
   H1 - Q = 521 CFS,
   H2 - Q = 332 CFS
5. CULVERT IMPROVEMENTS
   Q = 521 CFS : 10'X6' RCBC
   U/S INV = 5116.50, S = 0.5%

OUTFALL 975 - REACH 4
3. 100-YR CONVEYANCE
   Q = 629 CFS
5. CULVERT IMPROVEMENTS
   Q = 629 CFS :12'X6' RCBC
   U/S INV = 5100.00, S = 0.5%

OUTFALL 971 - REACH 2
3. 100-YR CONVEYANCE
   Q = 414 CFS
4. CULVERT IMPROVEMENTS
   C1 - Q = 490 CFS : 14'X4' RCBC
   U/S INV = 5057.25, S = 0.5%
   C2 - Q = 414 CFS : 9'X5' RCBC
   U/S INV = 5063.0, S = 0.5%

OUTFALL 971 - REACH 1
3. 100-YR CONVEYANCE
   Q = 479 CFS

OUTFALL 975 - REACH 6
1. 100-YR DETENTION
   V = 16.7 AC-FT
   Q_{IN} = 479 CFS, Q_{OUT} = 254 CFS
3. 100-YR CONVEYANCE
   Q = 254 CFS

OUTFALL 971 - REACH 3
1. 100-YR DETENTION
   V = 46.0 AC-FT
   Q_{IN} = 945 CFS, Q_{OUT} = 414 CFS

OUTFALL 970 - REACH 1
1. 100-YR DETENTION
   V = 59.6 AC-FT
   Q_{IN} = 1,250 CFS, Q_{OUT}= 588 CFS
4. MAJOR DRAINAGEWAY PRESERVATION

OUTFALL 962 - REACH 2
1. 100-YR DETENTION

WELD CR. 5 · WELD CR. 10 · REACH 4 · REACH 5 · REACH 6 · REACH 7 · REACH 3 · REACH 2 · REACH 1 · H2 · H1 · C1 · C2 · SCOTTS ACRES · SITE BOUNDARY · GODDING HOLLOW · INTERSTATE 25 · RTD EMBANKMENT · COMMUNITY DITCH · ERIE PKWY. · STANLEY DITCH · 971 · 970

TOWN OF ERIE	TOWN OF ERIE OUTFALL SYSTEMS PLAN (EAST OF COAL CREEK)	RECOMMENDED PLANS	JANUARY 2020	MERRICK 2480 W. 26th Ave. Suite B225 Denver, CO 80211 T303.964.3333 F303.964.3355	FIGURE D6

LEGEND

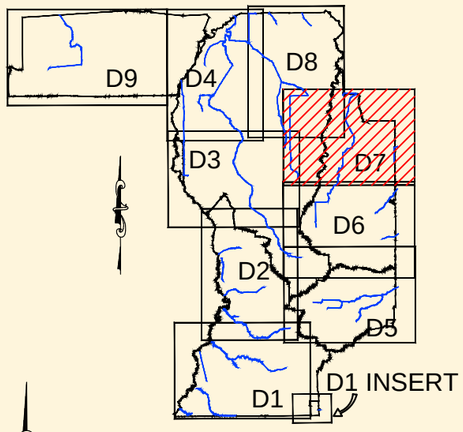
- ERIE MAJOR WATERSHED BOUNDARY
- WATERSHED BOUNDARY
- EXISTING DETENTION POND
- OUTFALL TRIBUTARY ALIGNMENT (> 130 ACRES)
- 915 — TRIBUTARY OUTFALL

ALTERNATIVES

- PROPOSED DETENTION POND
- PROPOSED CHANNEL (LABELED "H")
- MAJOR DRAINAGE PRESERVATION
- CULVERT IMPROVEMENTS (LABELED "C")

NOTES:

- UNLESS OTHERWISE SPECIFIED, ALL VOLUMES AND FLOW ARE 100-YEAR DEVELOPED CONDITION.
- PROPOSED DETENTION FACILITIES MAY BE DIVIDED INTO MULTIPLE DETENTION FACILITIES PROVIDED THE ALTERNATIVE OFFERS THE EQUIVALENT INTENT OF THE PLAN INCLUDING HYDRAULIC CAPACITY AND WATER QUALITY FUNCTIONS.
- ELEVATIONS SHOWN ARE ON NAVD88 VERTICAL DATUM
- TOWN GIS DATA AS OF DECEMBER 2017



KEY MAP

0 1000' 2000'

1" = 1000'

HWY 52

REACH 5
(SEE SHEET D8)

COTTONWOOD EXTENSION DITCH

WELD CR. 5

REACH 6

REACH 3

REACH 7

WELD CR. 12

PARKLAND ESTATES

SCOTTS ACRES

RTD EMBANKMENT

REACH 2

REACH 1

WELD CR. 7

COMMUNITY DITCH

INTERSTATE 25

H1 H2 H3

C1 C2

975 973 972

OUTFALL 951 - REACH 6
3. 100-YR CONVEYANCE
H1 - Q = 768 CFS
H2 - Q = 752 CFS
H3 - Q = 448 CFS
5. CULVERT IMPROVEMENTS
Q = 448 CFS : 8'X5' RCBC

OUTFALL 951 - REACH 7
4. MAJOR DRAINAGEWAY PRESERVATION
5. CULVERT IMPROVEMENTS
Q = 448 CFS : 8'X5' RCBC

OUTFALL 975 - REACH 7
1. 100-YR DETENTION
V = 17.7 AC-FT
Q_{IN} = 302 CFS Q_{OUT} = 145 CFS
4. MAJOR DRAINAGEWAY PRESERVATION
5. CULVERT IMPROVEMENTS
C2 - Q = 145 CFS 2- 5'X3' RCBC
U/S INV = 5014.79, S = 0.4%

OUTFALL 973 - REACH 1
4. MAJOR DRAINAGEWAY PRESERVATION

OUTFALL 975 - REACH 1
1. 100-YR DETENTION (NO WQ)
V = 55.8 AC-FT
Q_{IN} = 1,356 CFS, Q_{OUT} = 1,165 CFS
3. 100-YR CONVEYANCE
H1 - Q = 1,356 CFS
H2 - Q = 1,268 CFS
H3 - Q = 1,207 CFS
5. CULVERT IMPROVEMENTS
C1 - Q = 1,165 CFS : 3-12'X4' RCBC
U/S INV = 5009.48, S = 0.5%

OUTFALL 975 - REACH 2
1. 100-YR DETENTION
V = 28.8 AC-FT
Q_{IN} = 594 CFS, Q_{OUT} = 315 CFS
3. 100-YR CONVEYANCE
Q = 790 CFS
5. CULVERT IMPROVEMENTS
Q = 1,129 CFS : 2 - 8'X6' RCBC
U/S INV = 5048.0, S = 0.5%

OUTFALL 975 - REACH 3
3. 100-YR CONVEYANCE
H1-Q = 790 CFS
H2-Q = 675 CFS
5. CULVERT IMPROVEMENTS
Q = 790 CFS : 12'X6' RCBC
U/S INV = 5059.0, S = 0.5%

OUTFALL 972 - REACH 1
4. MAJOR DRAINAGEWAY PRESERVATION

OUTFALL 975 - REACH 5

OUTFALL 971 - REACH 2

TOWN OF ERIE	TOWN OF ERIE OUTFALL SYSTEMS PLAN (EAST OF COAL CREEK)	RECOMMENDED PLANS	JANUARY 2020	MERRICK 2480 W. 26th Ave. Suite B225 Denver, CO 80211 T303.964.3333 F303.964.3355	FIGURE D7

LEGEND

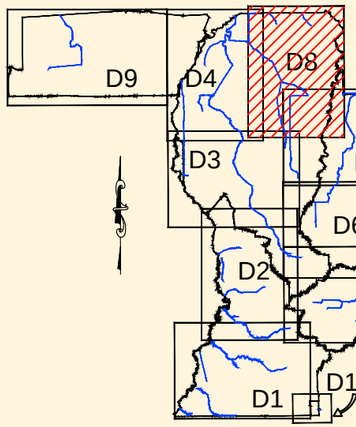
- ERIE MAJOR WATERSHED BOUNDARY
- WATERSHED BOUNDARY
- EXISTING DETENTION POND
- OUTFALL TRIBUTARY ALIGNMENT (> 130 ACRES)
- 915 — TRIBUTARY OUTFALL

ALTERNATIVES

- PROPOSED DETENTION POND
- PROPOSED CHANNEL (LABELED "H")
- MAJOR DRAINAGE PRESERVATION
- CULVERT IMPROVEMENTS (LABELED "C")

NOTES:

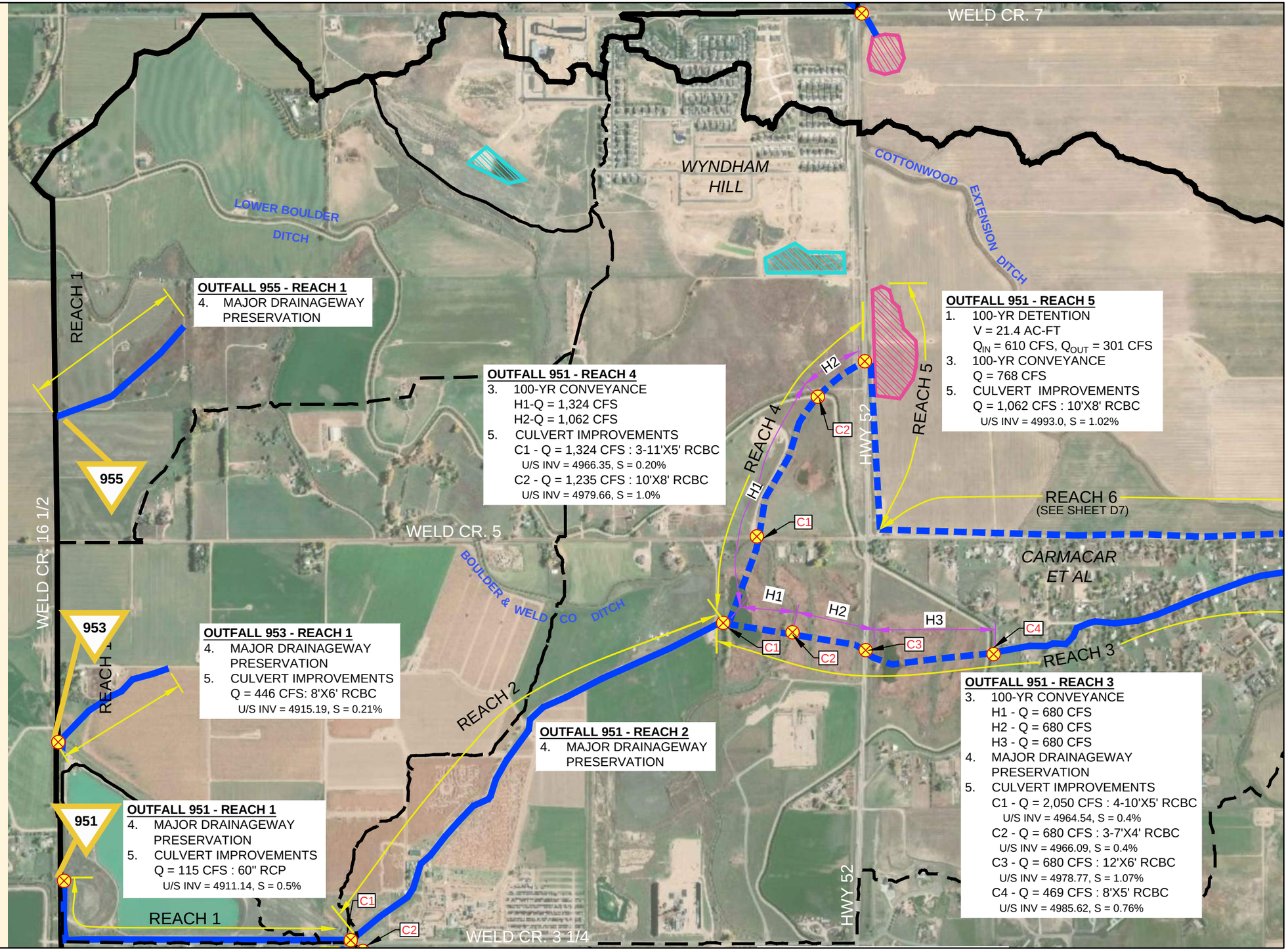
- UNLESS OTHERWISE SPECIFIED, ALL VOLUMES AND FLOW ARE 100-YEAR DEVELOPED CONDITION.
- PROPOSED DETENTION FACILITIES MAY BE DIVIDED INTO MULTIPLE DETENTION FACILITIES PROVIDED THE ALTERNATIVE OFFERS THE EQUIVALENT INTENT OF THE PLAN INCLUDING HYDRAULIC CAPACITY AND WATER QUALITY FUNCTIONS.
- ELEVATIONS SHOWN ARE ON NAVD88 VERTICAL DATUM
- TOWN GIS DATA AS OF DECEMBER 2017



KEY MAP

0 1000' 2000'

1" = 1000'



TOWN OF ERIE	TOWN OF ERIE OUTFALL SYSTEMS PLAN (EAST OF COAL CREEK)	RECOMMENDED PLANS	JANUARY 2020	MERRICK 2480 W. 26th Ave. Suite B225 Denver, CO 80211 T303.964.3333 F303.964.3355	FIGURE D8

Appendix E
NRCS Soils Report

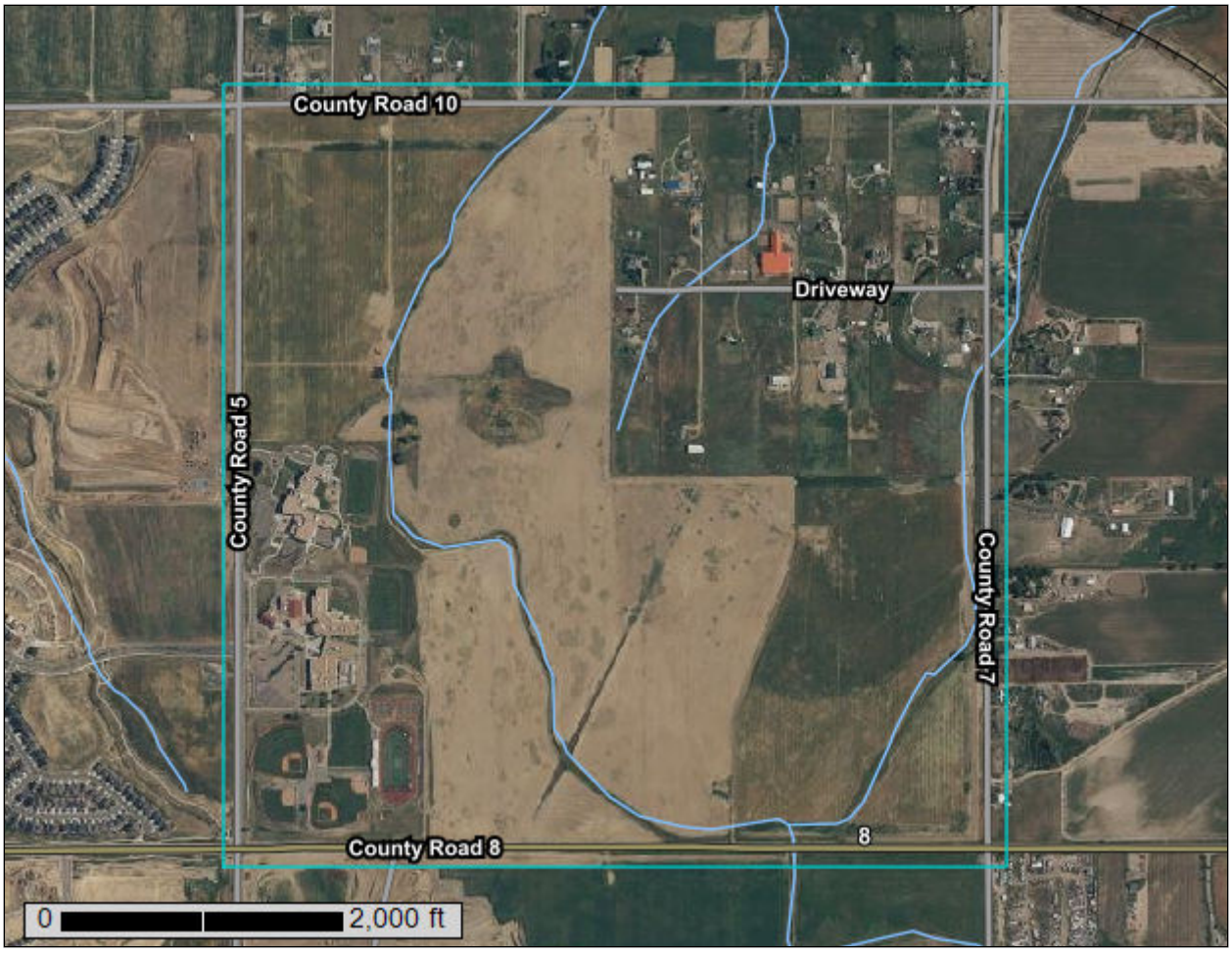
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Weld County, Colorado, Southern Part



October 18, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

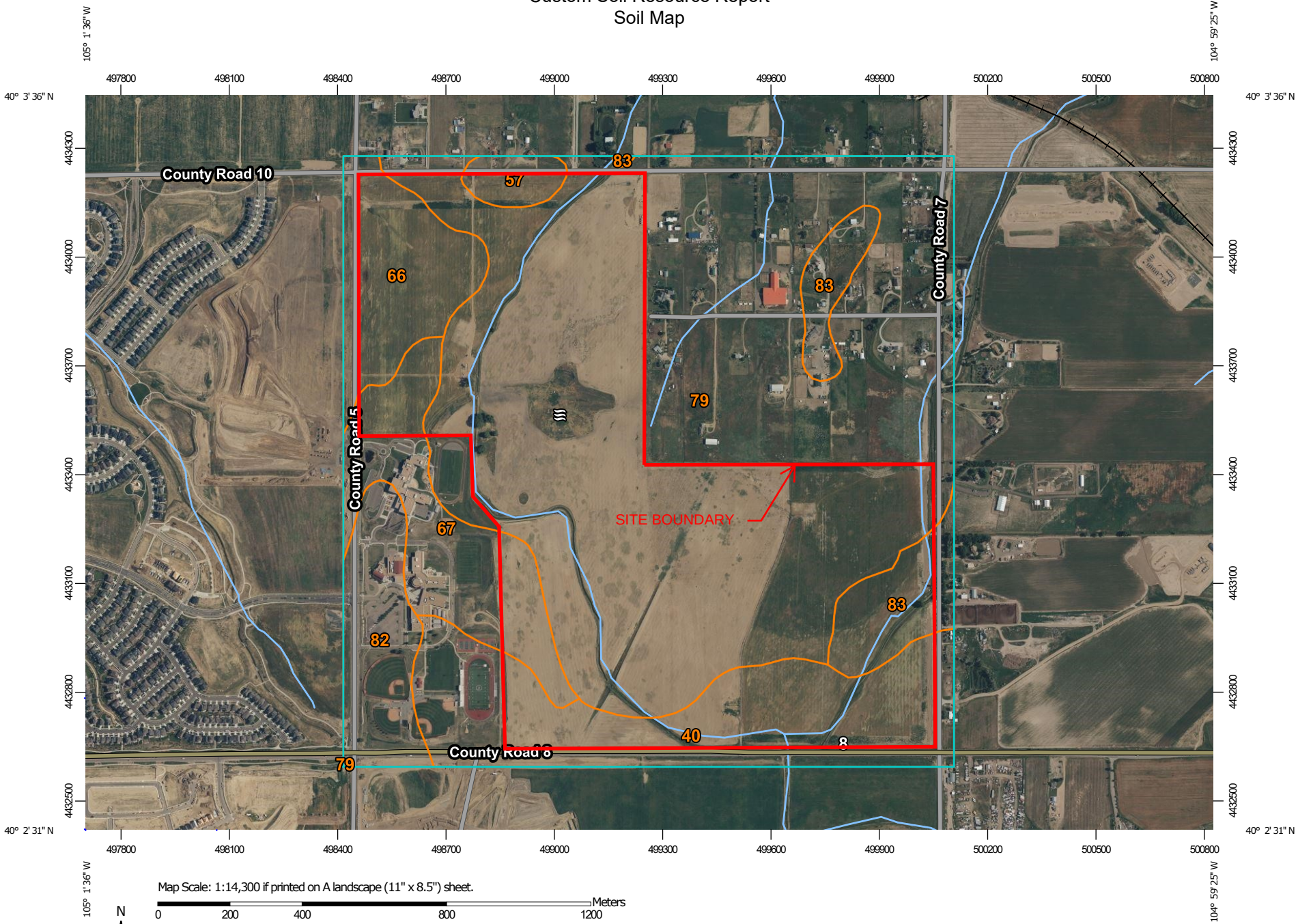
Contents

Preface..... 2
Soil Map..... 5
Soil Map.....6
Legend.....7
Map Unit Legend..... 8
Map Unit Descriptions..... 8
Weld County, Colorado, Southern Part.....10
40—Nunn loam, 1 to 3 percent slopes.....10
57—Renohill clay loam, 3 to 9 percent slopes..... 11
66—Ulm clay loam, 0 to 3 percent slopes.....12
67—Ulm clay loam, 3 to 5 percent slopes.....13
79—Weld loam, 1 to 3 percent slopes..... 15
82—Wiley-Colby complex, 1 to 3 percent slopes.....16
83—Wiley-Colby complex, 3 to 5 percent slopes.....18

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:14,300 if printed on A landscape (11" x 8.5") sheet.

N

0 200 400 800 1200 Meters

0 500 1000 2000 3000 Feet

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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 21, Sep 1, 2022

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

Date(s) aerial images were photographed: Jul 2, 2021—Aug 25, 2021

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
40	Nunn loam, 1 to 3 percent slopes	97.2	13.7%
57	Renohill clay loam, 3 to 9 percent slopes	8.4	1.2%
66	Ulm clay loam, 0 to 3 percent slopes	42.0	5.9%
67	Ulm clay loam, 3 to 5 percent slopes	54.2	7.7%
79	Weld loam, 1 to 3 percent slopes	434.4	61.4%
82	Wiley-Colby complex, 1 to 3 percent slopes	35.4	5.0%
83	Wiley-Colby complex, 3 to 5 percent slopes	35.3	5.0%
Totals for Area of Interest		**706.9**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit

descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Weld County, Colorado, Southern Part

40—Nunn loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tln2
Elevation: 3,900 to 6,250 feet
Mean annual precipitation: 13 to 16 inches
Mean annual air temperature: 46 to 54 degrees F
Frost-free period: 135 to 160 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Nunn and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nunn

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Pleistocene aged alluvium and/or eolian deposits

Typical profile

Ap - 0 to 6 inches: loam
Bt1 - 6 to 10 inches: clay loam
Bt2 - 10 to 26 inches: clay loam
Btk - 26 to 31 inches: clay loam
Bk1 - 31 to 47 inches: loam
Bk2 - 47 to 80 inches: loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 7 percent
Maximum salinity: Nonsaline (0.1 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum: 0.5
Available water supply, 0 to 60 inches: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Minor Components

Wages

Percent of map unit: 8 percent
Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Fort collins

Percent of map unit: 5 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Haverson, very rarely flooded

Percent of map unit: 2 percent
Landform: Terraces, drainageways, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear, concave
Ecological site: R067BY036CO - Overflow
Hydric soil rating: No

57—Renohill clay loam, 3 to 9 percent slopes

Map Unit Setting

National map unit symbol: 3636
Elevation: 4,850 to 5,200 feet
Mean annual precipitation: 11 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 100 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Renohill and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Renohill

Setting

Landform: Hills, ridges
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Residuum weathered from shale

Typical profile

H1 - 0 to 9 inches: clay loam
H2 - 9 to 32 inches: clay loam
H3 - 32 to 36 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 9 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R067BY042CO - Clayey Plains
Hydric soil rating: No

Minor Components

Shingle

Percent of map unit: 10 percent
Hydric soil rating: No

Ulm

Percent of map unit: 5 percent
Hydric soil rating: No

66—Ulm clay loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 363j
Elevation: 5,070 to 5,200 feet
Mean annual precipitation: 13 to 15 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 105 to 120 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Ulm and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ulm

Setting

Landform: Plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and/or eolian deposits derived from shale

Typical profile

H1 - 0 to 5 inches: clay loam
H2 - 5 to 19 inches: clay
H3 - 19 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R067BY042CO - Clayey Plains
Hydric soil rating: No

Minor Components

Renohill

Percent of map unit: 10 percent
Hydric soil rating: No

Heldt

Percent of map unit: 5 percent
Hydric soil rating: No

67—Ulm clay loam, 3 to 5 percent slopes

Map Unit Setting

National map unit symbol: 363k
Elevation: 5,070 to 5,200 feet
Mean annual precipitation: 13 to 15 inches
Mean annual air temperature: 46 to 48 degrees F

Frost-free period: 105 to 120 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Ulm and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ulm

Setting

Landform: Plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and/or eolian deposits derived from shale

Typical profile

H1 - 0 to 5 inches: clay loam
H2 - 5 to 17 inches: clay
H3 - 17 to 60 inches: clay loam

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R067BY042CO - Clayey Plains
Hydric soil rating: No

Minor Components

Renohill

Percent of map unit: 11 percent
Hydric soil rating: No

Heldt

Percent of map unit: 4 percent
Hydric soil rating: No

79—Weld loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2x0hw
Elevation: 3,600 to 5,750 feet
Mean annual precipitation: 12 to 17 inches
Mean annual air temperature: 46 to 54 degrees F
Frost-free period: 115 to 155 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Weld and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weld

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous loess

Typical profile

Ap - 0 to 8 inches: loam
Bt1 - 8 to 12 inches: clay
Bt2 - 12 to 15 inches: clay loam
Btk - 15 to 28 inches: loam
Bk - 28 to 60 inches: silt loam
C - 60 to 80 inches: silt loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Maximum salinity: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: High (about 11.3 inches)

Interpretive groups

Land capability classification (irrigated): 2e

Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: C
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Minor Components

Adena
Percent of map unit: 8 percent
Landform: Interfluves
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Colby
Percent of map unit: 7 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Keith
Percent of map unit: 3 percent
Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Baca
Percent of map unit: 2 percent
Landform: Interfluves
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

82—Wiley-Colby complex, 1 to 3 percent slopes

Map Unit Setting
National map unit symbol: 3643

Elevation: 4,850 to 5,000 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Wiley and similar soils: 60 percent
Colby and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wiley

Setting

Landform: Plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous eolian deposits

Typical profile

H1 - 0 to 11 inches: silt loam
H2 - 11 to 60 inches: silty clay loam
H3 - 60 to 64 inches: silty clay loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.7 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Description of Colby

Setting

Landform: Plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous eolian deposits

Typical profile

H1 - 0 to 7 inches: loam
H2 - 7 to 60 inches: silt loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Minor Components

Heldt

Percent of map unit: 4 percent
Hydric soil rating: No

Weld

Percent of map unit: 4 percent
Hydric soil rating: No

Keith

Percent of map unit: 2 percent
Hydric soil rating: No

83—Wiley-Colby complex, 3 to 5 percent slopes

Map Unit Setting

National map unit symbol: 3644
Elevation: 4,850 to 5,000 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Wiley and similar soils: 55 percent
Colby and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wiley

Setting

Landform: Plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous eolian deposits

Typical profile

H1 - 0 to 11 inches: silt loam
H2 - 11 to 60 inches: silty clay loam
H3 - 60 to 64 inches: silty clay loam

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.7 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Description of Colby

Setting

Landform: Plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous eolian deposits

Typical profile

H1 - 0 to 7 inches: loam
H2 - 7 to 60 inches: silt loam

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent

Available water supply, 0 to 60 inches: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Minor Components

Heldt

Percent of map unit: 9 percent
Hydric soil rating: No

Weld

Percent of map unit: 6 percent
Hydric soil rating: No

Appendix F

Excerpts from the Colliers Hill Filing 4G Phase III Drainage Report
Excerpts from the Final Drainage Report for Erie High School

PHASE III DRAINAGE REPORT
COLLIERS HILL FILING 4G
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
January 24, 2020
Last Revised May 27, 2021

ENGINEER'S CERTIFICATION

I hereby certify that this Phase III drainage report for the design of Colliers Hill Filing 4G 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.

Thomas S. Ackerman

Thomas Ackerman, P.E.
Registered Professional Engineer
State of Colorado No. 41133

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 4G will contain 205 single-family residential lots, a neighborhood park, a community center, and a future multi-family development on proposed Tract A. Filing 4G is located at the southwest corner of Weld County Roads 5 and 10.

The site is currently undeveloped and covered with native vegetation. The on-site soils are Weld Loam (Hydrologic Soil Group C), Ulm Loam (Hydrologic Soil Group C), and Wiley-Colby Complex (Hydrologic Soil Group B). Runoff from the site generally drains westerly across the site at slopes ranging from 6% to 1%. This runoff enters the regional drainage channel west of the site. This drainage report analyzes the drainage facilities required for Colliers Hill Filing 4G. This report analyzes the impact of storm events only, and is not intended to analyze effects of future irrigation, final lot grading or ground water conditions.

II. DRAINAGE BASINS

Colliers Hill Filing 4G lies within Boulder Creek Drainage Basin. Colliers Hill Filing 4G does not lie within the 100-year floodplain per FIRM Maps 08013C0442J dated December 18, 2012. There are no designated wetlands within the proposed development.

Storm runoff from Colliers Hill Filing 4G drains to the regional drainage channel located to the west of Filing 4G. The regional drainage channel outfalls into the Colliers Hill Regional Detention Pond located on the south side of Weld County Road 10. This regional detention pond was designed to accommodate the proposed development of Colliers Hill Filing 4G. 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 drainage channel and the Colliers Hill Regional Detention Pond. Filing 4G is located within UDSWM Basin 107 as defined by the *Phase III Drainage Report Colliers Hill Filings 4 & 5.* For the design of the regional detention pond, Basin 107 had an assumed imperviousness of 32.2%. Considering the proposed improvements of this

development, the percent imperviousness of Basin 107 is 33.5%. No significant difference exists between the previous analysis of Basin 107 and the currently proposed development. See **Appendices A, F,** and **H**.

Approximately 900 feet south of Weld County Road 10, an existing 18-inch culvert crosses Weld County Road 5 and outfalls onto Colliers Hill Filing 4G. This culvert conveys runoff from the northern detention pond of the Soaring Heights PK-8 school (Refer to **Appendix G)**, offsite basin OS1, and Weld County Road 5 basin C1. The combined flows are as follows.

Q_2 = 1.4 cfs

Q_{10} = 18.2 cfs

Q_{100} = 94.7 cfs

III. DRAINAGE DESIGN CRITERIA

The Rational Method was used to determine the storm runoff from the Colliers Hill Filing 4G drainage basins. **See Appendix A**. The Rational Method is presented in *The Urban Drainage and Flood Control Criteria Manual* and *Town of Erie Design Standards*. The onsite streets, storm pipes, and inlets will be designed considering a 2-year minor storm event and a 100-year major storm event.

IV. DRAINAGE FACILITY DESIGN

The drainage facility design concept is to convey the on-site and off-site flows crossing Colliers Hill 4G to the existing regional drainage channel. The 2-year minor storm flows will be conveyed through storm pipes. The 100-year flows exceeding the capacity of the storm sewer system will travel overland to the regional drainage channel. The existing storm sewer system in Flora View Drive will be extended to serve the proposed single-family residences of Filing 4G, the neighborhood park, and the community center. The future multi-family development on Tract A will be served by a future storm outfall into the regional drainage channel.

At the proposed community center entrance from Alpine Ridge Street, approximately 138 cfs will enter the community center drive during the 100-year storm event. These flows will be conveyed by the community center drive to Flora View Drive. This drive has an approximate capacity of 195 cfs. **See Appendices B & E**

The existing 18-inch culvert draining the offsite area east of Weld County Road 5 under Weld County Road 5 will be replaced by a 36-inch storm pipe. This 36-inch storm pipe will convey the 100-year offsite runoff under Weld County Road 5. This offsite area includes the northern detention pond of the Soaring Heights PK-8 school, offsite basin OS1, and Weld County Road 5 basin C1. At type D inlet SF-100, the 100-year flows exceeding the capacity of the downstream storm sewer system will surcharge. These surcharged flows will be conveyed by a swale toward Goodrich Peak Street, overtop the roadside walk, enter the local road, and travel downstream.

To facilitate drainage at the rear of Lots 4 through 6 of Block 6, 12 inch private stormlines and inlets will be installed in the rear of these lots. These stormlines and inlets will be maintained by the homeowners association.

The proposed streets have adequate capacity to convey the minor and major storm flows. **See Appendix B**. The proposed inlets are analyzed in **Appendix C**. The proposed storm pipes are analyzed in **Appendix D**.

V. ERIE OUTFALL SYSTEMS PLAN (EAST OF COAL CREEK)

A comprehensive analysis of the Town of Erie outfall systems, east of Coal Creek, including existing and future drainage facilities has been completed by Merrick dated January 2020. The site of Colliers Filing 4G is located within the analyzed basin 435 with a watershed area of 156 Acres. Two conveyance elements are located with the 435 basin, element 158 & 160. Conveyance element 158 is the existing regional drainage channel that conveys Colliers Hill runoff north to an existing regional detention pond along WCR 10. Element 160 is the flow route to convey flows under WCR 5 and downhill to the drainage channel. This element will be piped through the proposed Filing 4G storm system to the existing drainage channel. The existing drainage channel (Reach 6) has sufficient capacity to handle the developed runoff for Filing 4G and will not require improvements. See **Appendix I** for maps and excerpts from the referenced report.

VI. SUMMARY

The Colliers Hill Filing 4G drainage facilities are designed to capture developed runoff and convey those flows to the regional drainage channel west of the site. The facilities generally conform to the Town of Erie's outfall system plan. All facilities will be designed using Urban Drainage and Town of Erie Criteria.

This report presents drainage facilities designed for storm events only. The facilities are not designed for any excess irrigation water or subsurface drainage.

VII. REFERENCES

1. Town of Erie, Colorado. 2017. *Standards and Specifications for Design and Construction of Public Improvements.*
2. Urban Drainage and Flood Control District. June 2001, Revised April 2008. *Urban Storm Drainage Criteria Manual Volumes 1 and 2.*
3. Urban Drainage and Flood Control District. November 2010. *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. JVA Consulting Engineers. March 7, 2017 *Phase III Drainage Study for SVVSD Erie PK-8 School at County Road 5*
6. Merrick. January 2020. *Town of Erie Outfall Systems Plan (East of Coal Creek).*

VIII. APPENDICES

Rational Method Runoff Analysis…….**Appendix A**

Street Capacity Analysis……..…….....….**Appendix B**

Inlet Analysis……..…….…….....**Appendix C**

Storm Pipe & Swale Analysis……..…….……..**Appendix D**

100-Year Street Overflow Analysis……..…….……..**Appendix E**

Offsite Runoff Analysis……...……..**Appendix F**

Soaring Heights PK-8 release rate……..**Appendix G**

Excerpts from Filing 4 & 5 Drainage Report……**Appendix H**

Excerpts from Erie Outfall Systems Plan……..**Appendix I**

Lot 1, Block 15 Clubhouse Drainage Analysis……...….**Appendix J**

Maps……...…….……..**Appendix K**

1. Vicinity Map
2. FIRM Map
3. Colliers Hill Overall Master Drainage Plan (Map Pocket)
4. Colliers Hill Filing 4G Drainage Plan (Map Pocket)
5. Existing Conditions Drainage Exhibit (Map Pocket)

APPENDIX A
RATIONAL METHOD
RUNOFF ANALYSIS

Runoff Coefficients

Basin	Area (ac.)	% Imperviousness Calculations							NRCS Soil			2-Year			5-Year			10-Year			100-Year			Runoff Coefficients			
		SFR (45%) (acres)	Lawns (2%) (acres)	Streets & Walks (100%) (acres)	Roof (90%) (acres)	Gravel (40%) (acres)	Multi-Family (75%) (acres)	% Imp.	% A	% B	% C/D	C_A	C_B	$C_{C/D}$	C_A	C_B	$C_{C/D}$	C_A	C_B	$C_{C/D}$	C_A	C_B	$C_{C/D}$	C_2	C_5	C_{10}	C_{100}
F1	5.26	0.88	4.28	0.09	0	0	0	**10.9**			100	0.05	0.06	0.07	0.05	0.08	0.12	0.06	0.15	0.21	0.20	0.48	0.53	**0.07**	**0.12**	**0.21**	**0.53**
F2	1.99	0	1.84	0.15	0	0	0	**9.6**			100	0.04	0.05	0.06	0.04	0.07	0.11	0.05	0.13	0.20	0.18	0.47	0.52	**0.06**	**0.11**	**0.20**	**0.52**
F3	1.34	1.21	0.13	0	0	0	0	**40.7**			100	0.26	0.29	0.30	0.27	0.32	0.37	0.29	0.39	0.43	0.43	0.62	0.65	**0.30**	**0.37**	**0.43**	**0.65**
F4	1.86	0.55	0.13	1.18	0	0	0	**76.8**			100	0.60	0.62	0.62	0.61	0.64	0.66	0.63	0.68	0.70	0.71	0.79	0.80	**0.62**	**0.66**	**0.70**	**0.80**
F5	1.20	1.20	0	0	0	0	0	**45.0**			100	0.30	0.33	0.34	0.31	0.36	0.40	0.33	0.42	0.47	0.46	0.64	0.67	**0.34**	**0.40**	**0.47**	**0.67**
F6	3.68	3.68	0	0	0	0	0	**45.0**			100	0.30	0.33	0.34	0.31	0.36	0.40	0.33	0.42	0.47	0.46	0.64	0.67	**0.34**	**0.40**	**0.47**	**0.67**
F7	1.48	1.48	0	0	0	0	0	**45.0**			100	0.30	0.33	0.34	0.31	0.36	0.40	0.33	0.42	0.47	0.46	0.64	0.67	**0.34**	**0.40**	**0.47**	**0.67**
F8	1.80	1.80	0	0	0	0	0	**45.0**			100	0.30	0.33	0.34	0.31	0.36	0.40	0.33	0.42	0.47	0.46	0.64	0.67	**0.34**	**0.40**	**0.47**	**0.67**
F9	4.54	2.44	2.10	0	0	0	0	**25.1**			100	0.14	0.17	0.18	0.15	0.19	0.24	0.16	0.26	0.32	0.31	0.54	0.59	**0.18**	**0.24**	**0.32**	**0.59**
F10	3.49	3.49	0	0	0	0	0	**45.0**			100	0.30	0.33	0.34	0.31	0.36	0.40	0.33	0.42	0.47	0.46	0.64	0.67	**0.34**	**0.40**	**0.47**	**0.67**
F11	0.27	0	0.06	0.21	0	0	0	**79.6**			100	0.62	0.64	0.64	0.64	0.67	0.69	0.66	0.70	0.72	0.73	0.80	0.81	**0.64**	**0.69**	**0.72**	**0.81**
F12	1.02	0.23	0.75	0.05	0	0	0	**16.3**			100	0.08	0.10	0.11	0.08	0.12	0.17	0.09	0.19	0.25	0.24	0.50	0.55	**0.11**	**0.17**	**0.25**	**0.55**
F12A	7.23	1.48	5.11	0.63	0	0	0	**19.4**			100	0.10	0.12	0.13	0.11	0.14	0.19	0.12	0.21	0.28	0.26	0.52	0.56	**0.13**	**0.19**	**0.28**	**0.56**
F12B	2.39	0.92	1.45	0.03	0	0	0	**19.7**			100	0.10	0.13	0.13	0.11	0.15	0.20	0.12	0.22	0.28	0.26	0.52	0.56	**0.13**	**0.20**	**0.28**	**0.56**
F12C	0.50	0.50	0	0	0	0	0	**45.0**			100	0.30	0.33	0.34	0.31	0.36	0.40	0.33	0.42	0.47	0.46	0.64	0.67	**0.34**	**0.40**	**0.47**	**0.67**
F12D	0.14	0.00	0.09	0.05	0	0	0	**37.1**			100	0.23	0.26	0.27	0.24	0.29	0.34	0.26	0.36	0.41	0.40	0.60	0.64	**0.27**	**0.34**	**0.41**	**0.64**
F13	1.34	0.17	0.50	0.67	0	0	0	**56.5**			100	0.40	0.43	0.44	0.41	0.46	0.50	0.43	0.51	0.55	0.55	0.69	0.72	**0.44**	**0.50**	**0.55**	**0.72**
F14	2.12	0	1.31	0.75	0.06	0	0	**39.2**			100	0.25	0.28	0.29	0.26	0.31	0.36	0.27	0.37	0.42	0.42	0.61	0.64	**0.29**	**0.36**	**0.42**	**0.64**
F15	4.24	0	3.52	0.72	0	0	0	**18.7**			100	0.09	0.12	0.13	0.10	0.14	0.19	0.11	0.21	0.27	0.26	0.51	0.56	**0.13**	**0.19**	**0.27**	**0.56**
F15A	2.54	2.15	0.39	0	0	0	0	**38.3**			100	0.24	0.27	0.28	0.25	0.30	0.35	0.27	0.37	0.42	0.41	0.61	0.64	**0.28**	**0.35**	**0.42**	**0.64**
F16	2.23	2.23	0	0	0	0	0	**45.0**			100	0.30	0.33	0.34	0.31	0.36	0.40	0.33	0.42	0.47	0.46	0.64	0.67	**0.34**	**0.40**	**0.47**	**0.67**
F17	0.71	0	0.43	0.27	0	0	0	**39.9**			100	0.25	0.29	0.30	0.27	0.32	0.36	0.28	0.38	0.43	0.42	0.61	0.65	**0.30**	**0.36**	**0.43**	**0.65**
F18	0.47	0	0.28	0.18	0	0	0	**40.3**			100	0.26	0.29	0.30	0.27	0.32	0.37	0.28	0.38	0.43	0.42	0.62	0.65	**0.30**	**0.37**	**0.43**	**0.65**
F19	4.47	4.16	0.15	0.16	0	0	0	**45.6**			100	0.30	0.34	0.34	0.32	0.37	0.41	0.33	0.43	0.47	0.47	0.64	0.67	**0.34**	**0.41**	**0.47**	**0.67**
F20	4.31	3.72	0.57	0.02	0	0	0	**39.6**			100	0.25	0.28	0.29	0.26	0.31	0.36	0.28	0.38	0.42	0.42	0.61	0.65	**0.29**	**0.36**	**0.42**	**0.65**
F21	0.25	0	0.25	0	0	0	0	**2.0**			100	0.01	0.01	0.01	0.01	0.01	0.05	0.01	0.07	0.15	0.13	0.44	0.49	**0.01**	**0.05**	**0.15**	**0.49**
F22	0.59	0.24	0.14	0.21	0	0	0	**54.0**			100	0.38	0.41	0.42	0.39	0.44	0.48	0.41	0.49	0.53	0.53	0.68	0.71	**0.42**	**0.48**	**0.53**	**0.71**
F23	2.86	2.86	0	0	0	0	0	**45.0**			100	0.30	0.33	0.34	0.31	0.36	0.40	0.33	0.42	0.47	0.46	0.64	0.67	**0.34**	**0.40**	**0.47**	**0.67**
F23A	1.71	1.71	0	0	0	0	0	**45.0**			100	0.30	0.33	0.34	0.31	0.36	0.40	0.33	0.42	0.47	0.46	0.64	0.67	**0.34**	**0.40**	**0.47**	**0.67**
F24	1.34	1.34	0	0	0	0	0	**45.0**			100	0.30	0.33	0.34	0.31	0.36	0.40	0.33	0.42	0.47	0.46	0.64	0.67	**0.34**	**0.40**	**0.47**	**0.67**
F25	0.93	0.02	0.43	0.49	0	0	0	**54.1**		20	80	0.38	0.41	0.42	0.39	0.44	0.48	0.41	0.50	0.53	0.53	0.68	0.71	**0.42**	**0.47**	**0.53**	**0.70**
F25A	0.20	0.08	0.03	0.09	0	0	0	**63.0**			100	0.46	0.49	0.49	0.48	0.52	0.55	0.49	0.57	0.60	0.60	0.72	0.74	**0.49**	**0.55**	**0.60**	**0.74**
F26	1.69	1.69	0	0	0	0	0	**45.0**		14	86	0.30	0.33	0.34	0.31	0.36	0.40	0.33	0.42	0.47	0.46	0.64	0.67	**0.34**	**0.40**	**0.46**	**0.66**
F27	1.03	0.46	0.19	0.38	0	0	0	**57.5**			100	0.41	0.44	0.45	0.42	0.47	0.51	0.44	0.52	0.56	0.56	0.70	0.72	**0.45**	**0.51**	**0.56**	**0.72**
F28	0.43	0	0.13	0.29	0	0	0	**69.5**			100	0.52	0.55	0.55	0.54	0.58	0.61	0.56	0.62	0.65	0.65	0.75	0.77	**0.55**	**0.61**	**0.65**	**0.77**
F29	0.42	0	0.10	0.32	0	0	0	**76.3**			100	0.59	0.61	0.61	0.61	0.64	0.66	0.62	0.67	0.70	0.70	0.78	0.80	**0.61**	**0.66**	**0.70**	**0.80**
F29A	0.20	0	0.02	0.18	0	0	0	**89.5**			100	0.73	0.74	0.73	0.75	0.76	0.77	0.76	0.78	0.79	0.81	0.85	0.85	**0.73**	**0.77**	**0.79**	**0.85**
F30a	0.19	0	0.15	0.05	0	0	0	**25.4**			100	0.14	0.17	0.18	0.15	0.19	0.24	0.16	0.26	0.32	0.31	0.55	0.59	**0.18**	**0.24**	**0.32**	**0.59**
F30b	0.03	0	0	0.03	0	0	0	**100.0**			100	0.84	0.84	0.83	0.86	0.86	0.86	0.87	0.87	0.87	0.89	0.90	0.89	**0.83**	**0.86**	**0.87**	**0.89**
F30c	0.20	0	0.10	0.10	0	0	0	**51.4**			100	0.35	0.39	0.39	0.37	0.42	0.46	0.38	0.47	0.51	0.51	0.67	0.69	**0.39**	**0.46**	**0.51**	**0.69**
F30d	0.17	0	0.09	0.07	0	0	0	**45.4**			100	0.30	0.33	0.34	0.31	0.36	0.41	0.33	0.43	0.47	0.46	0.64	0.67	**0.34**	**0.41**	**0.47**	**0.67**
F30e	0.09	0	0.05	0.01	0.03	0	0	**41.7**			100	0.27	0.30	0.31	0.28	0.33	0.38	0.30	0.39	0.44	0.44	0.62	0.65	**0.31**	**0.38**	**0.44**	**0.65**
F30f	0.07	0	0.05	0.002	0.02	0	0	**29.0**			100	0.17	0.20	0.21	0.18	0.22	0.27	0.19	0.29	0.35	0.34	0.56	0.60	**0.21**	**0.27**	**0.35**	**0.60**
F31	0.99	0	0.31	0.68	0	0	0	**69.1**			100	0.52	0.55	0.55	0.54	0.58	0.60	0.55	0.62	0.64	0.65	0.75	0.77	**0.55**	**0.60**	**0.64**	**0.77**
F31A	0.54	0	0	0.54	0	0	0	**100.0**			100	0.84	0.84	0.83	0.86	0.86	0.86	0.87	0.87	0.87	0.89	0.90	0.89	**0.83**	**0.86**	**0.87**	**0.89**
F32	1.94	0	0.74	1.19	0	0	0	**62.4**			100	0.45	0.48	0.49	0.47	0.51	0.55	0.49	0.56	0.59	0.60	0.72	0.74	**0.49**	**0.55**	**0.59**	**0.74**
F32A	0.90	0	0.00	0.90	0	0	0	**100.0**			100	0.84	0.84	0.83	0.86	0.86	0.86	0.87	0.87	0.87	0.89	0.90	0.89	**0.83**	**0.86**	**0.87**	**0.89**
F33	0.29	0	0.26	0.03	0	0	0	**13.5**			100	0.06	0.08	0.09	0.07	0.10	0.15	0.07	0.17	0.23	0.22	0.49	0.54	**0.09**	**0.15**	**0.23**	**0.54**
F34	4.61	3.73	0.72	0.16	0	0	0	**40.2**			100	0.26	0.29	0.30	0.27	0.32	0.36	0.28	0.38	0.43	0.42	0.62	0.65	**0.30**	**0.36**	**0.43**	**0.65**
F35	2.70	2.16	0.34	0.20	0	0	0	**43.5**			100	0.28	0.32	0.33	0.30	0.35	0.39	0.31	0.41	0.45	0.45	0.63	0.66	**0.33**	**0.39**	**0.45**	**0.66**
F36	0.85	0.85	0	0	0	0	0	**45.0**			100	0.30	0.33	0.34	0.31	0.36	0.40	0.33	0.42	0.47	0.46	0.64	0.67	**0.34**	**0.40**	**0.47**	**0.67**
F37	2.52	2.26	0.16	0.10	0	0	0	**44.3**			100	0.29	0.32	0.33	0.30	0.35	0.40	0.32	0.42	0.46	0.46	0.63	0.67	**0.33**	**0.40**	**0.46**	**0.67**
F38	3.51	3.51	0	0	0	0	0	**45.0**			100	0.30	0.33	0.34	0.31	0.36	0.40	0.33	0.42	0.47	0.46	0.64	0.67	**0.34**	**0.40**	**0.47**	**0.67**
F39	0.84	0.84	0	0	0	0	0	**45.0**		31	69	0.30	0.33	0.34	0.31	0.36	0.40	0.33	0.42	0.47	0.46	0.64	0.67	**0.34**	**0.39**	**0.45**	**0.66**
F40	1.38	1.38	0.00	0	0	0	0	**45.0**		59	41	0.30	0.33	0.34	0.31	0.36	0.40	0.33	0.42	0.47	0.46	0.64	0.67	**0.33**	**0.38**	**0.44**	**0.65**
F41	1.17	1.17	0	0	0	0	0	**45.0**		66	34	0.30	0.33	0.34	0.31	0.36	0.40	0.33	0.42	0.47	0.46	0.64	0.67	**0.33**	**0.38**	**0.44**	**0.65**
F42	2.70	2.14	0.56	0	0	0	0	**36.1**		5	95	0.22	0.26	0.26	0.23	0.28	0.33	0.25	0.35	0.40	0.39	0.60	0.63	**0.26**	**0.33**	**0.40**	**0.63**
F43	2.95	1.85	1.10	0	0	0	0	**29.0**		32	68	0.17	0.20	0.21	0.18	0.22	0.27	0.19	0.29	0.35	0.34	0.56	0.60	**0.20**	**0.26**	**0.33**	**0.59**
F44	1.72	0	1.16	0.56	0	0	0	**34.0**		41	59	0.21	0.24	0.25	0.22	0.27	0.31	0.23	0.33	0.38	0.38	0.59	0.62	**0.24**	**0.29**	**0.36**	**0.61**
F45	1.12	0	0.29	0.83	0	0	0	**74.8**		25	75	0.58	0.60	0.60	0.59	0.63	0.65	0.61	0.66	0.69	0.69	0.78	0.79	**0.60**	**0.64**	**0.68**	**0.79**
F46	1.03	0	0.35	0.45	0.24	0	0	**64.9**		3	97	0.48	0.51	0.51	0.50	0.54	0.57	0.51	0.58	0.61	0.62	0.73	0.75	**0.51**	**0.57**	**0.61**	**0.75**
F47	13.81	0	0	0	0	0	13.81	**75.0**		22	78	0.58	0.60	0.60	0.60	0.63	0.65	0.61	0.66	0.69	0.70	0.78	0.79	**0.60**	**0.65**	**0.68**	**0.79**
Total	91.67	43.86	22.26	11.39	0.34	0	13.81	**46.1**																			
C1	0.66	0	0.31	0.35	0	0	0	**53.6**			100	0.37	0.41	0.41	0.39	0.44	0.47	0.40	0.49	0.53	0.53	0.68	0.70	**0.41**	**0.47**	**0.53**	**0.70**
OS1	48.76	0	48.19	0.00	0	0.57	0	**2.4**			100	0.01	0.01	0.01	0.01	0.02	0.06	0.01	0.08	0.15	0.13	0.44	0.49	**0.01**	**0.06**	**0.15**	**0.49**
X1	13.82	0	13.71	0.11	0	0	0.0	**2.8**			100	0.01	0.01	0.02	0.01	0.02	0.06	0.01	0.08	0.15	0.13	0.44	0.50	**0.02**	**0.06**	**0.15**	**0.50**
X2	76.87	3.23	72.06	1.58	0	0	0.0	**5.8**			100	0.02	0.03	0.03	0.02	0.04	0.08	0.03	0.10	0.18	0.16	0.45	0.51	**0.03**	**0.08**	**0.18**	**0.51**

Colliers Hill Filing 4G

Times of Concentration

Job Number: 2527-2

Basin	% Imperv-iousness	C_5	Overland Flow			Channelized Flow					T_c Eqn. 6-2 (min.)	Length (ft)	Slope (ft)	T_c Eqn. 6-5 (min.)	Design T_c (min.)
			Length (ft)	Slope (ft/ft)	T_i Eqn. 6-3 (mins)	Length (ft)	Slope (ft/ft)	K	Note	T_t Eqn. 6-4 (mins)					
F1	0.11	0.12	210	0.056	14.5	490	0.027	15	Grassed	3.3	17.8	490	0.027	28.9	**17.8**
F2	0.10	0.11	280	0.036	19.5	390	0.024	20	Curb	2.1	21.6	390	0.024	28.4	**21.6**
F3	0.41	0.37	55	0.055	5.6	795	0.025	20	Curb	4.2	9.8	795	0.025	24.8	**9.8**
F4	0.77	0.66	15	0.020	2.4	1200	0.022	20	Curb	6.7	9.2	1200	0.022	19.8	**9.2**
F5	0.45	0.40	55	0.020	7.4	705	0.028	20	Curb	3.5	10.9	705	0.028	22.9	**10.9**
F6	0.45	0.40	195	0.041	11.0	640	0.018	20	Curb	4.0	15.0	640	0.018	23.5	**15.0**
F7	0.45	0.40	55	0.020	7.4	855	0.018	20	Curb	5.3	12.7	855	0.018	25.3	**12.7**
F8	0.45	0.40	125	0.024	10.5	505	0.018	20	Curb	3.1	13.7	505	0.018	22.5	**13.7**
F9	0.25	0.24	300	0.035	17.8	815	0.027	20	Curb	4.1	21.9	815	0.027	28.3	**21.9**
F10	0.45	0.40	130	0.038	9.2	835	0.012	20	Curb	6.4	15.6	835	0.012	26.7	**15.6**
F11	0.80	0.69	15	0.020	2.3	380	0.009	20	Curb	3.3	5.6	380	0.009	15.8	**5.6**
F12	0.16	0.17	290	0.020	22.8	55	0.010	15	Grassed	0.6	23.4	55	0.010	24.0	**23.4**
F12A	0.19	0.19	720	0.020	34.9	50	0.010	15	Grassed	0.6	35.5	50	0.010	23.4	**23.4**
F12B	0.20	0.20	340	0.023	22.9	330	0.015	15	Grassed	3.0	25.9	330	0.015	26.5	**25.9**
F12C	0.45	0.40	-	-	-	-	-	-	-	-	-	-	-	-	**5.0**
F12D	0.37	0.34	75	0.020	9.5	30	0.010	15	Grassed	0.3	9.8	30	0.010	20.0	**9.8**
F13	0.56	0.50	30	0.025	4.4	980	0.016	20	Curb	6.5	10.9	980	0.016	24.0	**10.9**
F14	0.39	0.36	45	0.025	6.7	1130	0.019	20	Curb	6.8	13.5	1130	0.019	28.8	**13.5**
F15	0.19	0.19	265	0.040	17.0	405	0.016	15	Grassed	3.6	20.5	405	0.016	27.4	**20.5**
F15A	0.38	0.35	160	0.060	9.5	555	0.008	20	Curb	5.2	14.7	555	0.008	26.7	**14.7**
F16	0.45	0.40	50	0.025	6.6	810	0.008	20	Curb	7.5	14.1	810	0.008	28.2	**14.1**
F17	0.40	0.36	100	0.025	9.8	205	0.011	20	Curb	1.6	11.5	205	0.011	21.4	**11.5**
F18	0.40	0.37	50	0.025	6.9	325	0.010	20	Curb	2.7	9.6	325	0.010	22.8	**9.6**
F19	0.46	0.41	235	0.035	12.7	780	0.009	20	Curb	6.9	19.5	780	0.009	27.2	**19.5**
F20	0.40	0.36	255	0.025	15.8	740	0.009	20	Curb	6.5	22.3	740	0.009	28.2	**22.3**
F21	0.02	0.05	-	-	-	-	-	-	-	-	-	-	-	-	**5.0**
F22	0.54	0.48	20	0.020	4.0	440	0.010	20	Curb	3.7	7.7	440	0.010	21.2	**7.7**
F23	0.45	0.40	190	0.030	12.1	570	0.008	20	Curb	5.3	17.4	570	0.008	25.3	**17.4**
F23A	0.45	0.40	190	0.025	12.8	145	0.008	20	Curb	1.4	14.2	145	0.008	20.1	**14.2**
F24	0.45	0.40	50	0.025	6.6	880	0.011	20	Curb	7.0	13.6	880	0.011	27.5	**13.6**
F25	0.54	0.47	45	0.025	5.6	625	0.021	20	Curb	3.6	9.2	625	0.021	21.1	**9.2**
F25A	0.63	0.55	50	0.020	5.6	115	0.017	20	Curb	0.7	6.3	115	0.017	16.1	**6.3**
F26	0.45	0.40	125	0.035	9.4	420	0.040	20	Curb	1.8	11.1	420	0.040	20.6	**11.1**
F27	0.58	0.51	53	0.025	5.8	733	0.008	20	Curb	6.8	12.6	733	0.008	24.2	**12.6**
F28	0.70	0.61	35	0.020	4.2	465	0.010	20	Curb	3.9	8.1	465	0.010	18.3	**8.1**
F29	0.76	0.66	23	0.020	3.0	425	0.012	20	Curb	3.2	6.3	425	0.012	16.3	**6.3**
F29A	0.89	0.77	70	0.015	4.4	85	0.022	20	Curb	0.5	5.0	85	0.022	11.2	**5.0**
F30a	0.25	0.24	-	-	-	-	-	-	-	-	-	-	-	-	**5.0**
F30b	1.00	0.86	-	-	-	-	-	-	-	-	-	-	-	-	**5.0**
F30c	0.51	0.46	-	-	-	-	-	-	-	-	-	-	-	-	**5.0**
F30d	0.45	0.41	-	-	-	-	-	-	-	-	-	-	-	-	**5.0**
F30e	0.39	0.35	-	-	-	-	-	-	-	-	-	-	-	-	**5.0**
F30f	0.29	0.27	-	-	-	-	-	-	-	-	-	-	-	-	**5.0**
F31	0.69	0.60	35	0.025	3.9	880	0.007	20	Curb	8.8	12.7	880	0.007	23.6	**12.7**
F31A	1.00	0.86	-	-	-	915	0.007	20	Curb	9.1	9.1	915	0.007	16.9	**9.1**
F32	0.62	0.55	35	0.025	4.4	1405	0.013	20	Curb	10.3	14.6	1405	0.013	27.0	**14.6**
F32A	1.00	0.86	-	-	-	1485	0.014	20	Curb	10.5	10.5	1485	0.014	18.1	**10.5**
F33	0.13	0.15	-	-	-	-	-	-	-	-	-	-	-	-	**5.0**
F34	0.40	0.36	165	0.056	9.7	845	0.009	20	Curb	7.4	17.1	845	0.009	29.3	**17.1**
F35	0.43	0.39	175	0.050	9.9	465	0.015	20	Curb	3.2	13.1	465	0.015	22.8	**13.1**
F36	0.45	0.40	50	0.025	6.6	785	0.014	20	Curb	5.5	12.1	785	0.014	25.6	**12.1**
F37	0.44	0.40	50	0.025	6.6	1110	0.008	20	Curb	10.3	17.0	1110	0.008	32.1	**17.0**
F38	0.45	0.40	240	0.025	14.4	640	0.008	20	Curb	6.0	20.4	640	0.008	26.1	**20.4**
F39	0.45	0.39	50	0.025	6.7	580	0.020	20	Curb	3.5	10.2	580	0.020	22.9	**10.2**
F40	0.45	0.38	150	0.020	12.7	460	0.013	20	Curb	3.3	16.0	460	0.013	22.7	**16.0**
F41	0.45	0.38	155	0.020	13.0	275	0.028	20	Curb	1.4	14.3	275	0.028	20.1	**14.3**
F42	0.36	0.33	165	0.079	9.0	565	0.013	20	Curb	4.2	13.2	565	0.013	25.8	**13.2**
F43	0.29	0.26	300	0.067	14.1	505	0.025	20	Curb	2.7	16.7	505	0.025	25.2	**16.7**
F44	0.34	0.29	100	0.040	9.2	565	0.044	20	Curb	2.2	11.5	565	0.044	23.5	**11.5**
F45	0.75	0.64	45	0.020	4.4	1010	0.039	20	Curb	4.3	8.7	1010	0.039	17.7	**8.7**
F46	0.65	0.57	30	0.025	3.9	560	0.025	20	Curb	3.0	6.8	560	0.025	18.2	**6.8**
F47	0.75	0.65	115	0.050	5.2	1160	0.020	20	Curb	6.8	12.0	1160	0.020	20.3	**12.0**
C1	0.54	0.47	60	0.020	7.0	255	0.020	20	Curb	1.5	8.5	255	0.020	18.7	**8.5**
OS1	0.02	0.06	500	0.042	26.3	1500	0.020	5	Tillage/field	35.4	61.6	1500	0.020	44.5	**44.5**
X1	0.03	0.06	500	0.060	23.3	950	0.030	5	Tillage/field	18.3	41.6	950	0.030	35.3	**35.3**
X2	0.06	0.08	500	0.030	28.6	2400	0.015	5	Tillage/field	65.3	93.9	2400	0.015	58.3	**58.3**

Intensity = 28.5 * P_1 / ((10 + T_C)$^{0.786}$)

Town of Erie One-Hour Rainfall Depths

2-Year = 0.81

10-Year = 1.39

100-Year = 2.68

P_1 = 1-hour point rainfall depth

T_c = Time of Concentration

Colliers Hill Filing 4G

Job Number: 2527-2

Runoff Rates

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)
F1	5.26	0.07	0.21	0.53	17.8	*1.69*	*2.91*	*5.60*	**0.62**	**3.25**	**15.58**
F2	1.99	0.06	0.20	0.52	21.6	*1.53*	*2.62*	*5.06*	**0.18**	**1.06**	**5.27**
F3	1.34	0.30	0.43	0.65	9.8	*2.21*	*3.80*	*7.32*	**0.90**	**2.20**	**6.39**
F4	1.86	0.62	0.70	0.80	9.2	*2.27*	*3.89*	*7.50*	**2.59**	**5.05**	**11.12**
F5	1.20	0.34	0.47	0.67	10.9	*2.11*	*3.63*	*7.00*	**0.86**	**2.02**	**5.60**
F6	3.68	0.34	0.47	0.67	15.0	*1.84*	*3.16*	*6.09*	**2.29**	**5.40**	**14.98**
F7	1.48	0.34	0.47	0.67	12.7	*1.98*	*3.40*	*6.56*	**1.00**	**2.34**	**6.50**
F8	1.80	0.34	0.47	0.67	13.7	*1.92*	*3.30*	*6.35*	**1.17**	**2.75**	**7.63**
F9	4.54	0.18	0.32	0.59	21.9	*1.52*	*2.61*	*5.02*	**1.21**	**3.76**	**13.38**
F10	3.49	0.34	0.47	0.67	15.6	*1.81*	*3.10*	*5.98*	**2.13**	**5.02**	**13.93**
F11	0.27	0.64	0.72	0.81	5.6	*2.66*	*4.56*	*8.80*	**0.46**	**0.89**	**1.92**
F12	1.02	0.11	0.25	0.55	23.4	*1.46*	*2.51*	*4.85*	**0.16**	**0.65**	**2.73**
F12A	7.23	0.13	0.28	0.56	23.4	*1.46*	*2.51*	*4.84*	**1.39**	**5.00**	**19.72**
F12B	2.39	0.13	0.28	0.56	25.9	*1.39*	*2.38*	*4.58*	**0.44**	**1.58**	**6.19**
F12C	0.50	0.34	0.47	0.67	5.0	*2.75*	*4.71*	*9.09*	**0.47**	**1.10**	**3.06**
F12D	0.14	0.27	0.41	0.64	9.8	*2.21*	*3.79*	*7.31*	**0.08**	**0.21**	**0.65**
F13	1.34	0.44	0.55	0.72	10.9	*2.12*	*3.64*	*7.02*	**1.24**	**2.68**	**6.73**
F14	2.12	0.29	0.42	0.64	13.5	*1.93*	*3.31*	*6.39*	**1.19**	**2.96**	**8.72**
F15	4.24	0.13	0.27	0.56	20.5	*1.57*	*2.70*	*5.20*	**0.85**	**3.10**	**12.38**
F15A	2.54	0.28	0.42	0.64	14.7	*1.86*	*3.19*	*6.15*	**1.34**	**3.37**	**10.02**
F16	2.23	0.34	0.47	0.67	14.1	*1.89*	*3.25*	*6.26*	**1.43**	**3.37**	**9.35**
F17	0.71	0.30	0.43	0.65	11.5	*2.07*	*3.56*	*6.86*	**0.43**	**1.08**	**3.14**
F18	0.47	0.30	0.43	0.65	9.6	*2.22*	*3.82*	*7.36*	**0.31**	**0.77**	**2.23**
F19	4.47	0.34	0.47	0.67	19.5	*1.61*	*2.77*	*5.34*	**2.48**	**5.81**	**16.02**
F20	4.31	0.29	0.42	0.65	22.3	*1.50*	*2.58*	*4.98*	**1.90**	**4.73**	**13.86**
F21	0.25	0.01	0.15	0.49	5.0	*2.75*	*4.71*	*9.09*	**0.01**	**0.17**	**1.12**
F22	0.59	0.42	0.53	0.71	7.7	*2.42*	*4.15*	*8.00*	**0.60**	**1.31**	**3.34**
F23	2.86	0.34	0.47	0.67	17.4	*1.71*	*2.94*	*5.67*	**1.66**	**3.91**	**10.83**
F23A	1.71	0.34	0.47	0.67	14.2	*1.89*	*3.24*	*6.25*	**1.09**	**2.57**	**7.13**
F24	1.34	0.34	0.47	0.67	13.6	*1.93*	*3.31*	*6.37*	**0.88**	**2.07**	**5.73**
F25	0.93	0.42	0.53	0.70	9.2	*2.26*	*3.88*	*7.48*	**0.88**	**1.90**	**4.89**
F25A	0.20	0.49	0.60	0.74	6.3	*2.57*	*4.42*	*8.52*	**0.26**	**0.54**	**1.28**
F26	1.69	0.34	0.46	0.66	11.1	*2.10*	*3.60*	*6.95*	**1.20**	**2.79**	**7.78**
F27	1.03	0.45	0.56	0.72	12.6	*1.99*	*3.42*	*6.59*	**0.91**	**1.95**	**4.86**
F28	0.43	0.55	0.65	0.77	8.1	*2.37*	*4.07*	*7.85*	**0.56**	**1.12**	**2.58**
F29	0.42	0.61	0.70	0.80	6.3	*2.58*	*4.42*	*8.53*	**0.66**	**1.29**	**2.84**
F29A	0.20	0.73	0.79	0.85	5.0	*2.75*	*4.71*	*9.09*	**0.40**	**0.74**	**1.54**
F30a	0.19	0.18	0.32	0.59	5.0	*2.75*	*4.71*	*9.09*	**0.09**	**0.29**	**1.03**
F30b	0.03	0.83	0.87	0.89	5.0	*2.75*	*4.71*	*9.09*	**0.06**	**0.12**	**0.23**
F30c	0.20	0.39	0.51	0.69	5.0	*2.75*	*4.71*	*9.09*	**0.22**	**0.49**	**1.29**
F30d	0.17	0.34	0.47	0.67	5.0	*2.75*	*4.71*	*9.09*	**0.16**	**0.37**	**1.02**
F30e	0.09	0.31	0.44	0.65	5.0	*2.75*	*4.71*	*9.09*	**0.08**	**0.19**	**0.54**
F30f	0.07	0.21	0.35	0.60	5.0	*2.75*	*4.71*	*9.09*	**0.04**	**0.11**	**0.36**
F31	0.99	0.55	0.64	0.77	12.7	*1.98*	*3.40*	*6.56*	**1.08**	**2.17**	**4.98**
F31A	0.54	0.83	0.87	0.89	9.1	*2.27*	*3.90*	*7.51*	**1.01**	**1.82**	**3.60**
F32	1.94	0.49	0.59	0.74	14.6	*1.86*	*3.19*	*6.15*	**1.76**	**3.67**	**8.81**
F32A	0.90	0.83	0.87	0.89	10.5	*2.15*	*3.69*	*7.12*	**1.60**	**2.89**	**5.71**
F33	0.29	0.09	0.23	0.54	5.0	*2.75*	*4.71*	*9.09*	**0.07**	**0.32**	**1.43**
F34	4.61	0.30	0.43	0.65	17.1	*1.73*	*2.96*	*5.71*	**2.38**	**5.86**	**17.07**
F35	2.70	0.33	0.45	0.66	13.1	*1.96*	*3.36*	*6.47*	**1.72**	**4.11**	**11.57**
F36	0.85	0.34	0.47	0.67	12.1	*2.03*	*3.48*	*6.70*	**0.58**	**1.37**	**3.81**
F37	2.52	0.33	0.46	0.67	17.0	*1.73*	*2.97*	*5.73*	**1.46**	**3.45**	**9.63**
F38	3.51	0.34	0.47	0.67	20.4	*1.58*	*2.71*	*5.22*	**1.88**	**4.42**	**12.25**
F39	0.84	0.34	0.45	0.66	10.2	*2.18*	*3.74*	*7.21*	**0.62**	**1.42**	**3.99**
F40	1.38	0.33	0.44	0.65	16.0	*1.78*	*3.06*	*5.90*	**0.82**	**1.86**	**5.30**
F41	1.17	0.33	0.44	0.65	14.3	*1.88*	*3.22*	*6.22*	**0.73**	**1.64**	**4.69**
F42	2.70	0.26	0.40	0.63	13.2	*1.95*	*3.35*	*6.45*	**1.39**	**3.58**	**10.98**
F43	2.95	0.20	0.33	0.59	16.7	*1.74*	*2.99*	*5.77*	**1.05**	**2.91**	**10.03**
F44	1.72	0.24	0.36	0.61	11.5	*2.07*	*3.56*	*6.86*	**0.87**	**2.22**	**7.18**
F45	1.12	0.60	0.68	0.79	8.7	*2.31*	*3.97*	*7.66*	**1.56**	**3.03**	**6.77**
F46	1.03	0.51	0.61	0.75	6.8	*2.51*	*4.30*	*8.30*	**1.33**	**2.72**	**6.44**
F47	13.81	0.60	0.68	0.79	12.0	*2.03*	*3.49*	*6.72*	**16.87**	**32.86**	**73.26**
C1	0.66	0.41	0.53	0.70	8.5	*2.33*	*4.00*	*7.72*	**0.64**	**1.40**	**3.59**
OS1	48.76	0.01	0.15	0.49	44.5	*1.00*	*1.71*	*3.30*	**0.63**	**12.52**	**79.43**
X1	13.82	0.02	0.15	0.50	35.3	*1.15*	*1.98*	*3.82*	**0.24**	**4.18**	**26.13**
X2	76.87	0.03	0.18	0.51	58.3	*0.83*	*1.43*	*2.76*	**2.19**	**19.28**	**107.82**

APPENDIX B
STREET CAPACITY ANALYSIS

100-Year Street Analysis - Downstream End of Basins F13 & F14

Contributing Basins :	F12-F46, C1, OS1, Soaring Heights North Detention Pond	
Total Contributing Area (Excluding Soaring Heights Pond) :	127.28	acres
C_{100} :	0.58	
Time of Concentration :	58.7	min
100-Year One-Hour Rainfall Depth :	2.68	in
I_{100} :	2.75	in/hr
Q_{100}	201.78	cfs
Soaring Heights K-8 North Pond 100-Year Release :	11.70	cfs
Total 100-Year Flows at SF-48 :	**213.48**	**cfs**
Summation of Upstream Contributing Basin Minor Storm Flows :	40.77	cfs
100-Year Street Flows at Downstream End of Basins F13 & F14 =	**172.71**	**cfs**

100-Year Street Capacity at the Downstream End of Basins F13 & F14 = 200.63 cfs

Times of Concentration

% Imperv-iousness	C_5	Overland Flow			Channelized Flow					T_c Eqn. 6-2 (min.)	Length (ft)	Slope (ft/ft)	T_c Eqn. 6-5 (min.)	Design T_c (min.)
		Length (ft)	Slope (ft/ft)	T_i Eqn. 6-3 (mins)	Length (ft)	Slope (ft/ft)	K	Note	T_t Eqn. 6-4 (mins)					
0.25	0.24	500	0.042	26.3	1500	0.020	5	Tillage/field	35.4	76.9	3705	0.018	58.7	**58.7**
					1070	0.015	20	Curb	7.3					
					1135	0.014	20	Curb	8.0					

100-Year Street Capacity Calculations

Local Road - 60 foot Right-of-Way, 34.0 feet FL to FL, and Vertical Curbs

$Q = (1.486 / n) * Area * (Area / Wetted Perimeter)^{2/3} * Slope^{1/2} * Reduction Factor$

Area 1 =	4.69	s.f.
Wetted Perimeter 1 =	12.50	ft
n =	0.035	
$(1.486 / n) * Area * (Area / Wetted Perimeter)^{2/3}$ =	103.59	
Area 2 =	24.73	s.f.
Wetted Perimeter 2 =	35.67	ft
n =	0.016	
$(1.486 / n) * Area * (Area / Wetted Perimeter)^{2/3}$ =	1799.16	
Area 3 =	4.69	s.f.
Wetted Perimeter 3 =	12.50	ft
n =	0.035	
$(1.486 / n) * Area * (Area / Wetted Perimeter)^{2/3}$ =	103.59	

Total $(1.486 / n) * Area * (Area / Wetted Perimeter)^{2/3}$ = 2006.33

100-Year Street Capcacity = 2006.33 * $Slope^{1/2}$ * Reduction Factor

Analyzed Section - Downstream End of F13 & F14

Slope =	0.010	ft/ft
Reduction Factor =	1.00	
100-Year Street Capcacity =	**200.63**	**cfs**

100-Year Street Analysis - Downstream End of Basins F23 & F27

Contributing Basins : F15-F23A, F27, F31-F35, F37-F37A, C1, OS1, Soaring Heights North Detention Pond		
Total Contributing Area (Excluding Soaring Heights Pond) :	86.03	acres
C_{100} :	0.56	
Time of Concentration :	50.0	min
100-Year One-Hour Rainfall Depth :	2.68	in
I_{100} :	3.06	in/hr
Q_{100}	148.43	cfs
Soaring Heights K-8 North Pond 100-Year Release :	11.70	cfs
Total 100-Year Flows at SF-50 :	**160.13**	**cfs**
Summation of Upstream Contributing Basin Minor Storm Flows :	21.63	cfs
100-Year Street Flows at Downstream End of Basins F23 & F27 =	**138.50**	**cfs**

100-Year Street Capacity at the Downstream End of Basins F23 & F27 = 195.19 cfs

Times of Concentration

% Imperv-iousness	C_5	Overland Flow			Channelized Flow					T_c Eqn. 6-2 (min.)	Length (ft)	Slope (ft)	T_c Eqn. 6-5 (min.)	Design T_c (min.)
		Length (ft)	Slope (ft/ft)	T_i Eqn. 6-3 (mins)	Length (ft)	Slope (ft/ft)	K	Note	T_t Eqn. 6-4 (mins)					
0.20	0.20	500	0.042	26.3	1500	0.020	5	Tillage/field	35.4	68.9	2570	0.018	50.0	**50.0**
					1070	0.015	20	Curb	7.3					

100-Year Street Capacity Calculations

Local Road - 60 foot Right-of-Way, 34.0 feet FL to FL, and Mountable Curbs

$Q = (1.486 / n) * Area * (Area / Wetted Perimeter)^{2/3} * Slope^{1/2} * Reduction Factor$

Area 1 =	6.63	s.f.
Wetted Perimeter 1 =	12.17	ft
n =	0.035	
$(1.486 / n) * Area * (Area / Wetted Perimeter)^{2/3}$ =	187.76	
Area 2 =	25.44	s.f.
Wetted Perimeter 2 =	35.89	ft
n =	0.016	
$(1.486 / n) * Area * (Area / Wetted Perimeter)^{2/3}$ =	1878.36	
Area 3 =	6.63	s.f.
Wetted Perimeter 3 =	12.17	ft
n =	0.035	
$(1.486 / n) * Area * (Area / Wetted Perimeter)^{2/3}$ =	187.76	
Total $(1.486 / n) * Area * (Area / Wetted Perimeter)^{2/3}$ =	2253.89	

100-Year Street Capcacity = 2253.89 * $Slope^{1/2}$ * Reduction Factor

Analyzed Section - Downstream End of F23 & F27

Slope =	0.0075	ft/ft
Reduction Factor =	1.00	
100-Year Street Capcacity =	**195.19**	**cfs**

HURST & ASSOCIATES, INC.
CONSULTING ENGINEERS
1265 S. PUBLIC ROAD, SUITE B
Lafayette, Colorado 80026 (303) 449-9105

JOB 2527-2, Colliers Hill Filing 4G

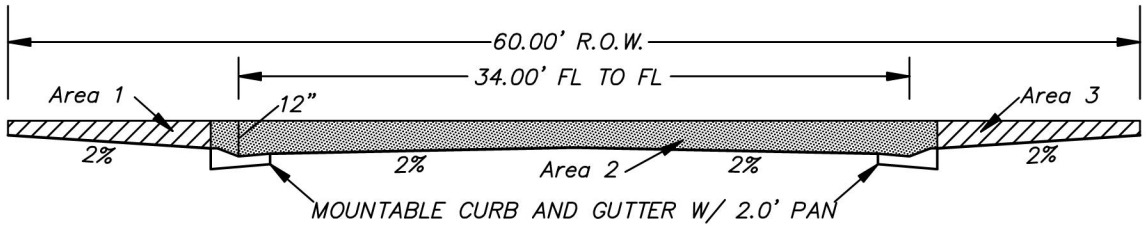
CALCULATED BY TA DATE 11/27/2019

CHECKED BY _____ DATE _____

SCALE: NTS SHEET NO. _____ OF _____

STREET CAPACITY ANALYSIS: MAJOR STORM EVENT

LOCAL STREET: 60 FOOT R.O.W. (MOUNTABLE CURBS)



Allowable Depth at FL = 12 inches

AREA 1:	6.63 S.F.
WET PERIMETER:	12.17 FEET
n:	0.035
AREA 2:	25.44 S.F.
WET PERIMETER:	35.89 FEET
n:	0.016
AREA 3:	6.63 S.F.
WET PERIMETER:	12.17 FEET
n:	0.035

$$Q_{allow.} = \frac{1.486}{n}(A)\left(\frac{A}{W.P.}\right)^{2/3} S^{1/2} * \text{Reduction Factor}$$

$$Q_{allow.} = 2253.89 * S^{1/2} * \text{Reduction Factor}$$

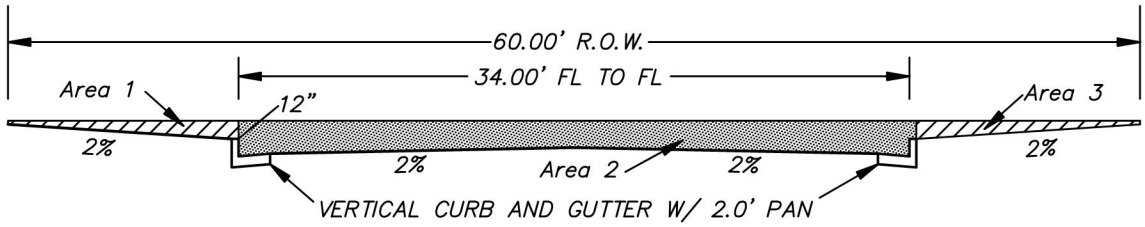
Street Slope	Reduction Factor	QALLOW
0.75%	1.0	195.19 cfs
1.0%	1.0	225.39 cfs

HURST & ASSOCIATES, INC.
CONSULTING ENGINEERS
1265 S. PUBLIC ROAD, SUITE B
Lafayette, Colorado 80026 (303) 449-9105

JOB 2527-2, Colliers Hill Filing 4G
CALCULATED BY TA DATE 11/27/2019
CHECKED BY _____ DATE _____
SCALE: NTS SHEET NO. _____ OF _____

STREET CAPACITY ANALYSIS: MAJOR STORM EVENT

LOCAL STREET: 60 FOOT R.O.W. (VERTICAL CURBS)



Allowable Depth at FL = 12 inches

AREA 1:	4.69 S.F.
WET PERIMETER:	12.50 FEET
n:	0.035
AREA 2:	24.73 S.F.
WET PERIMETER:	35.67 FEET
n:	0.016
AREA 3:	4.69 S.F.
WET PERIMETER:	12.50 FEET
n:	0.035

$$Q_{allow.} = \frac{1.486}{n}(A)\left(\frac{A}{W.P.}\right)^{2/3} S^{1/2} * \text{Reduction Factor}$$

$$Q_{allow.} = 2006.33 * S^{1/2} * \text{Reduction Factor}$$

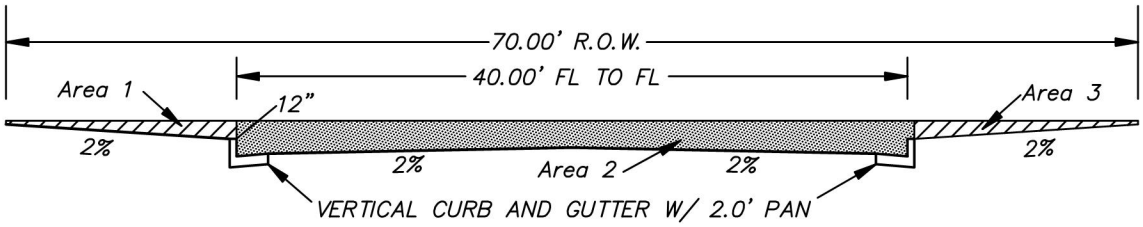
Street Slope	Reduction Factor	QALLOW
0.80%	1.0	179.45 cfs
1.00%	1.0	200.63 cfs

HURST & ASSOCIATES, INC.
CONSULTING ENGINEERS
1265 S. PUBLIC ROAD, SUITE B
Lafayette, Colorado 80026 (303) 449-9105

JOB 2527-2, Colliers Hill Filing 4G
CALCULATED BY JR DATE 11/3/2020
CHECKED BY _____ DATE _____
SCALE: NTS SHEET NO. _____ OF _____

STREET CAPACITY ANALYSIS: MAJOR STORM EVENT

COLLECTOR STREET: 70 FOOT R.O.W. (VERTICAL CURBS)



Allowable Depth at FL = 12 inches

AREA 1: 5.27 S.F.
WET PERIMETER: 14.50 FEET
n: 0.035

AREA 2: 28.09 S.F.
WET PERIMETER: 41.67 FEET
n: 0.016

AREA 3: 5.27 S.F.
WET PERIMETER: 14.50 FEET
n: 0.035

$$Q_{allow.} = \frac{1.486}{n}(A)\left(\frac{A}{W.P.}\right)^{2/3} S^{1/2} * \text{Reduction Factor}$$

$$Q_{allow.} = 2233.62 * S^{1/2} * \text{Reduction Factor}$$

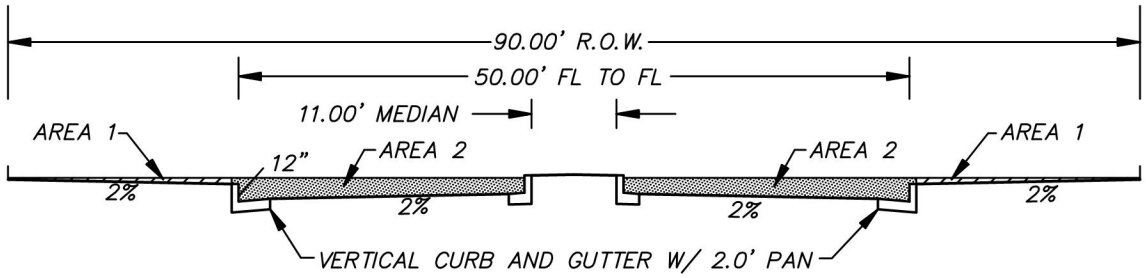
Street Slope	Reduction Factor	Q_{ALLOW}
0.80%	1.0	199.78 cfs
1.00%	1.0	223.36 cfs
2.00%	0.84	265.34 cfs
4.00%	0.48	214.43 cfs
4.75%	0.42	204.46 cfs

HURST & ASSOCIATES, INC.
CONSULTING ENGINEERS
1265 S. PUBLIC ROAD, SUITE B
Lafayette, Colorado 80026 (303) 449-9105

JOB 2527-2, Colliers Hill Filing 4G
CALCULATED BY JR DATE 11/3/2020
CHECKED BY _____ DATE _____
SCALE: NTS SHEET NO. _____ OF _____

STREET CAPACITY ANALYSIS: MAJOR STORM EVENT

ARTERIAL STREET: 90 FOOT R.O.W. (MEDIAN & VERTICAL CURBS)



Depth of water must not exceed street crown. The depth of water must not exceed 12 inches at flow line.

Allowable Depth at FL = 12 inches

AREA 1:	6.11 S.F.
WET PERIMETER:	19.50 FEET
n:	0.035

$$Q_{allow.} = \frac{1.486}{n}(A)\left(\frac{A}{W.P.}\right)^{2/3} S^{1/2} * \text{Reduction Factor}$$

AREA 2:	13.56 S.F.
WET PERIMETER:	20.31 FEET
n:	0.016

$$Q_{allow.} = 1081.71 * S^{1/2} * \text{Reduction Factor}$$

HALF STREET CAPACITY

Street Slope	Reduction Factor	Q_{ALLOW}
0.80%	1.0	96.75 cfs
1.00%	1.0	108.17 cfs

APPENDIX D
STORM PIPE &
SWALE ANALYSIS

Storm Pipe Sizing - 2 Year Minor Storm Event

Colliers Hill Filing 4G

Intensity = 28.5 * P_1 / ((10 + T_C)$^{0.786}$) RA-3, USDCM Vol. 1 Job # 2527-2

Town of Erie 2-Year One-Hour Rainfall Depth= 0.81 inches

Upstream & Downstream Design Points		Onsite Basins	Area (acres)	C_2	Pipe Slope (ft/ft)	Length (ft)	Routed T_C Route	T_i (min)	T_t (min)	T_c (min)	I_2 (in/hr)	Onsite 2-Year Flows (cfs)	2-Year Flows at SF-103 (cfs)	2-Year Design Flow (cfs)	Pipe Size (in)	Pipe Capacity (cfs)
SF-76	**SF-75A**	F15	4.24	0.13	0.0102	24.58	F15	20.5	0.0	20.5	*1.57*	**0.85**		**0.85**	**15**	6.52
SF-75A	**SF-75**	F15, F15A	6.78	0.19	0.0104	19.17	SF-76	20.5	0.1	20.6	*1.57*	**1.97**		**1.97**	**18**	10.71
SF-75	**SF-74**	F15, F15A	6.78	0.19	0.0103	35.92	SF-75A	20.6	0.1	20.7	*1.57*	**1.97**		**1.97**	**18**	10.66
SF-74	**SF-73**	F15, F15A	6.78	0.19	0.0102	44.20	SF-75	20.7	0.1	20.8	*1.56*	**1.96**		**1.96**	**18**	10.61
SF-73	**SF-72**	F15, F15A	6.78	0.19	0.0102	133.02	SF-74	20.8	0.1	20.9	*1.56*	**1.96**		**1.96**	**18**	10.61
SF-72	**SF-70**	F15, F15A	6.78	0.19	0.0102	99.86	SF-73	20.9	0.4	21.4	*1.54*	**1.93**		**1.93**	**18**	10.61
SF-71	**SF-70**	F16	2.23	0.34	0.0121	41.44	F16	14.1	0.0	14.1	*1.89*	**1.43**		**1.43**	**15**	7.11
SF-70	**SF-69**	F15, F15A, F16	9.02	0.22	0.0073	129.64	SF-72	21.4	0.3	21.7	*1.53*	**3.07**		**3.07**	**18**	8.97
SF-69	**SF-67**	F15, F15A, F16	9.02	0.22	0.0072	143.92	SF-70	21.7	0.4	22.1	*1.51*	**3.04**		**3.04**	**18**	8.91
SF-68	**SF-67**	F17,F18	1.17	0.30	0.0101	45.62	F18	9.6	0.0	9.6	*2.22*	**0.78**		**0.78**	**15**	6.49
SF-67	**SF-66**	F15-F18	10.19	0.23	0.0072	132.07	SF-69	22.1	0.5	22.6	*1.49*	**3.53**		**3.53**	**18**	8.91
SF-66	**SF-63**	F15-F18	10.19	0.23	0.0079	135.18	SF-67	22.6	0.4	23.0	*1.48*	**3.49**		**3.49**	**18**	9.34
SF-64	**SF-63**	F19	4.47	0.34	0.0050	17.00	F19	19.5	0.0	19.5	*1.61*	**2.48**		**2.48**	**15**	4.57
SF-65	**SF-63**	F20	4.31	0.29	0.0050	17.00	F20	22.3	0.0	22.3	*1.50*	**1.90**		**1.90**	**15**	4.57
SF-63	**SF-61**	F15-F20	18.97	0.27	0.0055	114.47	SF-66	23.0	0.5	23.5	*1.46*	**7.54**		**7.54**	**24**	16.78
SF-62D	**SF-62C**	F12C	0.50	0.34	0.0050	52.00	F12C	5.0	0.0	5.0	*2.75*	**0.47**		**0.47**	**12**	2.52
SF-62C	**SF-62B**	F12C	0.50	0.34	0.0050	52.00	SF-62D	5.0	0.2	5.2	*2.72*	**0.46**		**0.46**	**12**	2.52
SF-62B	**SF-62A**	F12C	0.50	0.34	0.0050	57.00	SF-62C	5.2	0.2	5.3	*2.70*	**0.46**		**0.46**	**12**	2.52
SF-62A	**SF-62**	F12C	0.50	0.34	0.0050	86.27	SF-62B	5.3	0.2	5.5	*2.67*	**0.46**		**0.46**	**12**	2.52
SF-62	**SF-61**	F12C,F21	0.75	0.23	0.0050	50.00	SF-62A	5.5	0.3	5.8	*2.63*	**0.46**		**0.46**	**15**	4.57
SF-61	**SF-60**	F12C,F15-F21	19.72	0.27	0.0054	191.39	SF-63	23.5	0.4	23.9	*1.45*	**7.73**		**7.73**	**24**	16.62
SF-60	**SF-58**	F12C,F15-F21	19.72	0.27	0.0055	30.85	SF-61	23.9	0.6	24.5	*1.43*	**7.62**		**7.62**	**24**	16.78
SF-59	**SF-58**	F22	0.59	0.42	0.0100	14.10	F22	7.7	0.0	7.7	*2.42*	**0.60**		**0.60**	**15**	6.46
SF-58	**SF-57**	F12C,F15-F22	20.32	0.27	0.0054	242.05	SF-60	24.5	0.1	24.6	*1.42*	**7.95**		**7.95**	**24**	16.62
SF-57A	**SF-57**	F23A	1.71	0.34	0.0100	19.91	F23A	14.2	0.0	14.2	*1.89*	**1.09**		**1.09**	**15**	6.46
SF-57	**SF-56**	F12C,F15-F22,F23A	22.02	0.28	0.0054	62.64	SF-58	24.6	0.8	25.4	*1.40*	**8.62**		**8.62**	**24**	16.62
SF-56	**SF-55**	F12C,F15-F22,F23A	22.02	0.27	0.0054	234.36	SF-57	25.4	0.2	25.6	*1.39*	**8.42**		**8.42**	**24**	16.62
SF-55	**SF-51**	F12C,F15-F22,F23A	22.02	0.27	0.0054	250.60	SF-56	25.6	0.8	26.4	*1.37*	**8.28**		**8.28**	**24**	16.62
SF-102A	**SF-102**	OS1	*See Note		0.075	24.67	OS1	*Refer to Offsite Runoff				**0.0**	1.36	**1.36**	**36**	182.66
SF-102	**SF-101**	F31A,F32A	1.43	0.83	0.0748	54.17	F32A	10.5	0.0	10.5	*2.15*	**2.56**	1.36	**3.92**	**36**	182.42
SF-101	**SF-100**	F31, F31A, F32, F32A	4.36	0.61	0.0325	69.81	F32	14.6	0.0	14.6	*1.86*	**4.98**	1.36	**6.34**	**42**	181.38
SF-100	**SF-99**	F31, F31A, F32, F32A	4.36	0.61	0.0045	95.00	SF-101	14.6	0.2	14.9	*1.85*	**4.94**	1.36	**6.31**	**18**	7.05
SF-99	**SF-98**	F31-F33	4.65	0.47	0.0063	46.00	SF-100	14.9	0.3	15.2	*1.83*	**4.00**	1.36	**5.37**	**18**	8.34
SF-98	**SF-97**	F31-F33	4.65	0.47	0.0045	172.22	SF-99	15.2	0.2	15.3	*1.82*	**3.98**	1.36	**5.35**	**18**	7.05
SF-97	**SF-96**	F31-F33	4.65	0.47	0.0045	55.31	SF-97	15.3	0.6	15.9	*1.79*	**3.91**	1.36	**5.28**	**18**	7.05
SF-96	**SF-93**	F31-F33	4.65	0.47	0.0045	251.63	SF-96	15.9	0.2	16.1	*1.78*	**3.89**	1.36	**5.25**	**18**	7.05
SF-95A	**SF-95**	F35	2.70	0.33	0.0100	17.00	F35	13.1	0.0	13.1	*1.96*	**1.72**		**1.72**	**15**	6.46
SF-95	**SF-94**	F35	2.70	0.33	0.0140	207.55	SF-95A	13.1	0.1	13.2	*1.95*	**1.72**		**1.72**	**18**	12.43
SF-94A	**SF-94**	F34	4.61	0.30	0.0100	17.00	F34	17.1	0.0	17.1	*1.73*	**2.38**		**2.38**	**15**	6.46
SF-94	**SF-93**	F34, F35	7.31	0.30	0.0100	47.67	SF-94A	17.1	0.1	17.2	*1.72*	**3.76**		**3.76**	**18**	10.50
SF-93	**SF-92**	F31-F35	11.96	0.37	0.0045	210.60	SF-95	16.1	0.8	16.9	*1.73*	**7.58**	1.36	**8.94**	**24**	15.18
SF-92	**SF-91**	F31-F35	11.96	0.37	0.0046	49.68	SF-93	16.9	0.7	17.6	*1.70*	**7.43**	1.36	**8.79**	**24**	15.34
SF-91	**SF-88**	F31-F35	11.96	0.37	0.0045	79.69	SF-92	17.6	0.2	17.8	*1.69*	**7.39**	1.36	**8.76**	**24**	15.18
SF-89	**SF-88**	F36	0.85	0.34	0.0100	17.00	F36	12.1	0.0	12.1	*2.03*	**0.58**		**0.58**	**15**	6.46
SF-90	**SF-88**	F37	2.52	0.33	0.0120	17.55	F37	17.0	0.0	17.0	*1.73*	**1.46**		**1.46**	**15**	7.08
SF-88	**SF-87**	F31-F37	15.33	0.36	0.0048	39.67	SF-90	17.0	0.1	17.0	*1.73*	**9.51**	1.36	**10.88**	**24**	15.67
SF-87	**SF-86**	F31-F37	15.33	0.36	0.0047	93.11	SF-88	17.0	0.1	17.2	*1.72*	**9.48**	1.36	**10.84**	**24**	15.51
SF-86	**SF-85**	F31-F37	15.33	0.36	0.0045	98.63	SF-87	17.2	0.3	17.5	*1.71*	**9.39**	1.36	**10.76**	**24**	15.18
SF-85	**SF-84**	F31-F37	15.33	0.36	0.0045	255.92	SF-86	17.5	0.3	17.8	*1.69*	**9.31**	1.36	**10.67**	**24**	15.18
SF-84	**SF-83**	F31-F37	15.33	0.36	0.0037	51.17	SF-85	17.8	0.9	18.6	*1.65*	**9.09**	1.36	**10.45**	**24**	13.76
SF-83	**SF-81**	F31-F37	15.33	0.36	0.0046	208.78	SF-84	18.6	0.2	18.8	*1.64*	**9.04**	1.36	**10.41**	**24**	15.34
SF-82	**SF-81**	F38, F39	4.35	0.34	0.0118	16.97	F38	20.4	0.0	20.4	*1.58*	**2.32**		**2.32**	**15**	7.02
SF-81	**SF-80**	F31-F39	19.68	0.35	0.0052	47.67	SF-83	18.8	0.7	19.5	*1.61*	**11.25**	1.36	**12.61**	**24**	16.31
SF-80	**SF-52**	F31-F39	19.68	0.35	0.0164	234.83	SF-81	19.5	0.2	19.7	*1.61*	**11.20**	1.36	**12.57**	**24**	28.97
SF-54	**SF-52**	F23,F24	4.20	0.34	0.0112	17.87	F23	17.4	0.0	17.4	*1.71*	**2.44**		**2.44**	**15**	6.84

Notes:

1. The assumed velocity of the runoff in the storm pipes is 5.0 fps.
2. Existing storm pipe slopes and lengths are from Filing 4C as-built drawings.
3. Manning's Equation was used to determine preliminary pipe capacities.
4. Refer to Offsite Runoff for OS1 Calcs.

Storm Pipe Sizing - 2 Year Minor Storm Event

Colliers Hill Filing 4G

Intensity = 28.5 * P_1 / ((10 + T_C)$^{0.786}$) RA-3, USDCM Vol. 1 Job # 2527-2

Town of Erie 2-Year One-Hour Rainfall Depth= 0.81 inches

Upstream & Downstream Design Points		Onsite Basins	Area (acres)	C_2	Pipe Slope (ft/ft)	Length (ft)	Routed T_C			T_c (min)	I_2 (in/hr)	Onsite 2-Year Flows (cfs)	2-Year Flows at SF-103 (cfs)	2-Year Design Flow (cfs)	Pipe Size (in)	Pipe Capacity (cfs)
							Route	T_i (min)	T_t (min)							
SF-53	**SF-52**	F25A,F26	1.89	0.35	0.0118	17.00	F26	11.1	0.0	11.1	*2.10*	**1.41**		**1.41**	**15**	7.02
SF-52	**SF-51**	F31-F39, F23, F24, F25A, F26	25.77	0.35	0.0133	45.17	SF-80	19.7	0.8	20.5	*1.57*	**14.27**	1.36	**15.64**	**24**	26.09
SF-51	**SF-48**	F12C,F15-F24,F25A,F26,F31-F39	47.80	0.32	0.0235	19.15	SF-55	26.4	0.8	27.3	*1.34*	**20.32**	1.36	**21.68**	**24**	34.68
SF-50	**SF-48**	F27	1.03	0.45	0.0060	42.01	F27	12.6	0.0	12.6	*1.99*	**0.91**		**0.91**	**15**	5.00
SF-48	**SF-47**	F12C,F15-F24,F25A,F26, F27,F31-F39	48.82	0.32	0.0092	256.60	SF-51	27.3	0.1	27.3	*1.34*	**20.90**	1.36	**22.27**	**30**	39.34
SF-47	**SF-46**	F12C,F15-F24,F25A,F26, F27,F31-F39	48.82	0.32	0.0097	155.08	SF-48	27.3	0.9	28.2	*1.32*	**20.54**	1.36	**21.90**	**30**	40.40
SF-46C	**SF-46B**	F30a - F30f	0.75	0.31	0.0100	30.00	F30a	5.0	0.0	5.0	*2.75*	**0.65**		**0.65**	**15**	6.46
SF-46B	**SF-46**	F29, F30a-F30f	1.17	0.42	0.0120	29.27	F29	6.3	0.0	6.3	*2.58*	**1.27**		**1.27**	**15**	7.08
SF-46A	**SF-46**	F28	0.42	0.61	0.0100	24.88	F29	6.3	0.0	6.3	*2.58*	**0.66**		**0.66**	**15**	6.46
SF-46	**SF-45**	F12C, F15-F24, F25A, F26-F29, F30a-F39	50.41	0.32	0.0208	132.93	SF-47	28.2	0.5	28.7	*1.30*	**21.30**	1.36	**22.66**	**30**	59.16
SF-45A	**SF-45**	F29A	0.20	0.73	0.0100	30.76	F29A	5.0	0.0	5.0	*2.75*	**0.40**		**0.40**	**15**	6.46
SF-45	**SF-44**	F12C, F15-F24, F25A, F26-F39	50.61	0.33	0.0172	49.77	SF-46	28.7	0.4	29.1	*1.29*	**21.29**	1.36	**22.66**	**30**	53.79
SF-44	**SF-24**	F12C, F15-F24, F25A, F26-F39	50.61	0.33	0.0116	79.99	SF-45	29.1	0.2	29.3	*1.29*	**21.22**	1.36	**22.59**	**30**	44.18
SF-115	**SF-114**	F42	2.70	0.26	0.0181	40.96	F42	13.2	0.0	13.2	*1.95*	**1.39**		**1.39**	**18**	14.13
SF-114	**SF-112**	F42	2.70	0.26	0.0083	259.54	SF-115	13.2	0.1	13.3	*1.94*	**1.38**		**1.38**	**18**	9.57
SF-113	**SF-112**	F40, F41	2.55	0.33	0.0200	19.17	F40	16.0	0.0	16.0	*1.78*	**1.51**		**1.51**	**18**	14.86
SF-112	**SF-111**	F40-F42	5.25	0.30	0.0050	123.28	SF-113	16.0	0.1	16.1	*1.78*	**2.78**		**2.78**	**18**	7.43
SF-111	**SF-109**	F40-F42	5.25	0.30	0.0050	89.21	SF-112	16.1	0.4	16.5	*1.76*	**2.75**		**2.75**	**18**	7.43
SF-110	**SF-109**	F43, F44	4.67	0.22	0.0200	18.60	F43	16.7	0.0	16.7	*1.74*	**1.78**		**1.78**	**15**	9.14
SF-109	**SF-107**	F40-F44	9.92	0.26	0.0050	52.50	SF-110	16.7	0.1	16.8	*1.74*	**4.50**		**4.50**	**18**	7.43
SF-108	**SF-107**	F45	1.12	0.60	0.0100	48.49	F45	8.7	0.0	8.7	*2.31*	**1.56**		**1.56**	**15**	6.46
SF-107	**SF-106**	F40-F45	11.04	0.30	0.0162	113.82	SF-109	16.8	0.2	17.0	*1.73*	**5.64**		**5.64**	**18**	13.37
SF-106	**SF-103**	F40-F45	11.04	0.30	0.0227	400.00	SF-107	17.0	0.4	17.4	*1.71*	**5.58**		**5.58**	**18**	15.83
SF-105	**SF-103**	F25	0.93	0.42	0.0100	55.55	F25	9.2	0.0	9.2	*2.26*	**0.88**		**0.88**	**15**	6.46
SF-104	**SF-103**	F46	1.03	0.51	0.0100	47.02	F46	6.8	0.0	6.8	*2.51*	**1.33**		**1.33**	**15**	6.46
SF-103	**SF-25A**	F25, F40-F46	13.01	0.32	0.0139	134.60	SF-106	17.4	1.3	18.7	*1.65*	**6.89**		**6.89**	**18**	12.38
SF-25A	**SF-25**	F25, F40-F46	13.01	0.32	0.0246	223.10	SF-108	18.7	0.4	19.1	*1.63*	**6.80**		**6.80**	**24**	35.48
SF-25	**SF-24**	F25, F40-F46	13.01	0.32	0.0207	230.01	SF-25A	19.1	0.7	19.9	*1.60*	**6.67**		**6.67**	**24**	32.55
SF-24	**SF-20**	F12C, F15-F46	63.61	0.32	0.0085	282.28	SF-44	29.3	0.3	29.6	*1.28*	**26.46**	1.36	**27.82**	**30**	37.82
SF-36	**SF-35**	F12A	7.23	0.13	0.0067	170.08	F12A	23.4	0.0	23.4	*1.46*	**1.39**		**1.39**	**18**	8.60
SF-35	**SF-21**	F12A, F12B	9.62	0.13	0.0060	126.38	SF-36	23.4	0.6	24.0	*1.44*	**1.83**		**1.83**	**18**	8.14
SF-21	**SF-20**	F12, F12A, F12B	9.62	0.13	0.0092	60.00	SF-35	24.0	0.4	24.4	*1.43*	**1.81**		**1.81**	**18**	10.08
SF-20	**SF-19**	F12-F12D, F15-F46	73.23	0.30	0.0079	175.11	SF-24	29.6	0.9	30.5	*1.26*	**27.57**	1.36	**28.93**	**30**	36.46
SF-1	**SF-2**	F1	5.26	0.07	0.0027	55.58	F1	17.8	0.0	17.8	*1.69*	**0.62**		**0.62**	**18**	5.46
SF-2	**SF-3**	F1	5.26	0.07	0.0063	106.65	SF-1	17.8	0.2	18.0	*1.68*	**0.61**		**0.61**	**18**	8.34
SF-4	**SF-3**	F2, F3	3.33	0.16	0.0113	18.62	F2	21.6	0.0	21.6	*1.53*	**0.80**		**0.80**	**18**	11.17
SF-3	**SF-5**	F1-F3	8.59	0.10	0.0040	45.04	SF-4	21.6	0.1	21.7	*1.53*	**1.36**		**1.36**	**18**	6.64
SF-5	**SF-6**	F1-F3	8.59	0.10	0.0245	353.58	SF-3	21.7	0.2	21.8	*1.52*	**1.35**		**1.35**	**24**	35.41
SF-7	**SF-6**	F4	1.86	0.62	0.0216	18.99	F4	9.2	0.0	9.2	*2.27*	**2.59**		**2.59**	**18**	15.44
SF-6	**SF-8**	F1-F4	10.45	0.19	0.0137	32.80	SF-5	21.8	1.2	23.0	*1.48*	**3.01**		**3.01**	**30**	48.01
SF-8	**SF-9**	F1-F4	10.45	0.19	0.0148	335.95	SF-6	23.0	0.1	23.1	*1.47*	**3.00**		**3.00**	**30**	49.90
SF-14	**SF-12**	F9	4.54	0.18	0.0063	63.13	F9	21.9	0.0	21.9	*1.52*	**1.21**		**1.21**	**18**	8.34
SF-13	**SF-12**	F5	1.20	0.34	0.0200	18.46	F5	10.9	0.0	10.9	*2.11*	**0.86**		**0.86**	**18**	14.86
SF-12	**SF-10**	F5, F9	5.73	0.21	0.0058	189.19	SF-14	21.9	0.2	22.1	*1.51*	**1.82**		**1.82**	**18**	8.00
SF-11	**SF-10**	F6	3.68	0.34	0.0407	17.46	F6	15.0	0.0	15.0	*1.84*	**2.29**		**2.29**	**18**	21.19
SF-10	**SF-9**	F5, F6, F9	9.41	0.26	0.0080	46.50	SF-12	22.1	0.6	22.7	*1.49*	**3.65**		**3.65**	**18**	9.40
SF-9	**SF-15**	F1-F6, F9	19.86	0.23	0.0141	275.85	SF-10	22.7	0.2	22.9	*1.48*	**6.65**		**6.65**	**30**	48.71
SF-15	**SF-16**	F1-F6, F9	19.86	0.23	0.0140	279.50	SF-9	22.9	0.9	23.8	*1.45*	**6.50**		**6.50**	**30**	48.53
SF-18	**SF-16**	F8, F10	5.28	0.34	0.0155	15.53	SF-10	15.6	0.0	15.6	*1.81*	**3.23**		**3.23**	**18**	13.08
SF-17	**SF-16**	F7, F13	2.82	0.39	0.0076	18.51	F7	12.7	0.0	12.7	*1.98*	**2.16**		**2.16**	**18**	9.16
SF-16	**SF-19**	F1-F10, F13	27.97	0.26	0.0011	46.77	SF-15	23.8	0.9	24.8	*1.42*	**10.45**		**10.45**	**30**	13.60
SF-19	**SF-22**	F1-F10, F12-F13, F15-F46	101.20	0.29	0.0154	22.79	SF-20	30.5	0.6	31.1	*1.24*	**36.42**	1.36	**37.79**	**42**	124.85
SF-22	**SF-23**	F1-F46	103.58	0.29	0.0219	98.23	SF-19	31.1	0.1	31.2	*1.24*	**37.35**	1.36	**38.71**	**42**	148.89

Notes:

1. The assumed velocity of the runoff in the storm pipes is 5.0 fps.
2. Existing storm pipe slopes and lengths are from Filing 4C as-built drawings.
3. Manning's Equation was used to determine preliminary pipe capacities.
4. Refer to Offsite Runoff for OS1 Calcs.

Swale A - 100-Year Analysis

Swale Characteristics	
Contributing Basin :	F15
Design flow (Q_{100}) (cfs):	**12.38**
Slope of channel bank (z:1) (entre z):	4
Base width (b) (ft)	2
Minimum channel depth (ft):	**1.80**
Downstream Slope of Swale (S) (ft/ft):	**0.0150**
Manning's n:	0.035
100-Year Depth Calculations	
100-Year Depth (y_n) (ft):	**0.77**
100-year depth area (A) (ft^2):	3.94
100-year depth wetted perimeter (P) (ft):	8.38
100-year depth top Width (ft):	8.19
Capacity at 100-year depth (cfs):	**12.38**
100-year velocity (v_n) (fps):	**3.1**
Froude number:	0.80
Full Depth Calculations	
Full depth area (A) (ft^2):	16.56
Full depth wetted perimeter (P) (ft):	16.84
Full depth top width (ft) :	16.40
Capacity at full depth (cfs) :	**85.14**
Design freeboard (ft) :	1.03

Swale C - 100-Year Analysis

Swale Characteristics	
Contributing Basin :	F21
Design flow (Q_{100}) (cfs):	**1.12**
Slope of channel bank (z:1) (entre z):	4
Base width (b) (ft)	2
Minimum channel depth (ft):	**1.26**
Downstream Slope of Swale (S) (ft/ft):	**0.0100**
Manning's n:	0.035
100-Year Depth Calculations	
100-Year Depth (y_n) (ft):	**0.26**
100-year depth area (A) (ft^2):	0.79
100-year depth wetted perimeter (P) (ft):	4.15
100-year depth top Width (ft):	4.09
Capacity at 100-year depth (cfs):	**1.12**
100-year velocity (v_n) (fps):	**1.4**
Froude number:	0.56
Full Depth Calculations	
Full depth area (A) (ft^2):	8.87
Full depth wetted perimeter (P) (ft):	12.39
Full depth top width (ft) :	12.08
Capacity at full depth (cfs) :	**30.14**
Design freeboard (ft) :	1.00

Swale B - 100-Year Analysis

Channel Characteristics	
Design flow (Q_{100}) (cfs):	**117.82**
** Q_{100} @ SF-103 + Q_{100} from basins F31, F31A, F32, F32A*	
Slope of channel bank (z:1) (entre z):	4
Base width (b) (ft)	12
Minimum channel depth (ft):	**2.45**
Slope of channel (S) (ft/ft):	0.0162
Manning's n:	0.042
100-Year Depth (y_n) (ft):	**1.42**
100-year depth area (A) (ft^2):	25.16
100-Year depth wetted perimeter (P) (ft):	23.73
100-year depth top Width (ft):	23.38
Capacity at 100-year depth (cfs):	**117.82**
100-year velocity (v_n) (fps):	**4.7**
Froude number:	0.80
Full Depth Calculations	
Full depth area (A) (ft^2):	53.41
Full depth wetted perimeter (P) (ft):	32.20
Full depth top width (ft) :	31.60
Capacity at full depth (cfs) :	**337.00**
Minimum freeboard (ft):	1.00
Design freeboard (ft) :	1.03

Minimum Riprap d_{50} (inches)= 1.87 inches

Use Type 'L' Riprap

$d_{50} > (VS^{0.17} / (4.5(G_S-1)^{0.66})^2$ Equation 8-11

APPENDIX F
OFFSITE RUNOFF ANALYSIS

OFFSITE RUNOFF ANALYSIS

Colliers Hill Filing 4G
Job Number: 2527-2

At SF-102A, there are three sources of offiste runoff.

1. Soaring Heights K-8 north detention pond from JVA's Phase III Drainage Study for SVVSD Erie PK-8 School at County Road 5 Erie, CO, March 7 2019
2. Basin C1 from JVA's Phase III Drainage Study for SVVSD Erie PK-8 School at County Road 5 Erie, CO, March 7 2019
3. Basin OS1

Sources	Q_2 (cfs)	Q_{10} (cfs)	Q_{100} (cfs)
North Pond Outfall	0.10	4.30	11.70
Basin C1	0.64	1.40	3.59
Basin OS1	0.63	12.52	79.43
Total Flows at SF-102A	**1.36**	**18.22**	**94.72**

The 100-year offsite runoff at SF-102A will be conveyed by 36-inch reinforced concrete pipe under Weld County Road 5. At Type D Inlet SF-100, 100-year flows exceeding the capacity of the downstream storm sewer system will surcharge. These surcharged flows will be conveyed by Swale B toward the local road right-of-way, overtop the roadside walk, enter the local road right-of-way, and travel downstream.

100-Year Storm Pipe Analysis

Upstream & Downstream Design Points		**Inlet 100-Year Captured Flows** (cfs)	**Total 100-Year Offsite Flows at SF-103** (cfs)	**100-Year Design Flow** (cfs)	**Pipe Size** (in)	**Pipe Capacity** (cfs)
SF-102A	**SF-102**	0.00	94.72	**94.72**	36	**177.60**
SF-102	**SF-101**	8.54	94.72	**103.26**	36	**173.16**
SF-101	**SF-100**	8.54	94.72	**111.80**	36	**180.33**

APPENDIX G

SOARING HEIGHTS PK-8 RELEASE RATES

TOTAL SITE								
North Pond	9.47	38.2%	0.34	0.38	0.48	0.68	14.2	46.11
South Pond	5.30	48.8%	0.43	0.48	0.56	0.73	10.8	26.69

2. Three (3) offsite runoff basins are proposed for the developed condition. These basins will not have increased impervious area and will maintain historic drainage patterns, therefore, no detention will be provided for this area.

   Developed offsite basin OS1 is 3.15 acres and consists of runoff generated by the northernmost basin of the developed site. Developed OS1 is 19.5% impervious with a 100-year runoff coefficient of 0.60 generating 11.5 cfs in the 100-year storm event. This basin is generally consistent with historic sub-basin H1B, however a swale will be installed to route generated runoff west to the discharge point at the north CR5 drainage swale whereas historically runoff crossed the northern property line and drained across the adjacent site to the north.

   Developed offsite basin OS2 is 3.11 acres and defined within the southeast corner of the property and consists of landscaped play areas and fields. This basin is 0.8% impervious with a 100-year runoff coefficient of 0.51 generating 10.5 cfs in the 100-year storm event. Developed offsite basin OS2 generally follows consistent drainage patterns of historic sub-basin H2B and outfalls into the existing catch basin located on the northern curb of the HS site. The catch basin at design point OS2 will receive a minor increase in flows compared to historic rates. However, flows that bypass the catch basin at OS2 will be directed west along the curb and gutter to OS3, which receives significantly less flows in the developed condition compared to historical

   Developed offsite basin OS3 is .63 acres and consists of runoff generated from a portion of the staff parking lot and the landscaping to the south. Basin OS3 is 63.5% impervious with a 100-year runoff coefficient of 0.79 generating 3.51 cfs in the 100-year storm event. Developed offsite basin OS3 generally follows consistent drainage patterns of historic sub-basin H2A and outfalls at well below the historic rate of 28.49 cfs into the existing catch basin located west of the existing bus drop lane. The catch basin at the outfall of basin H2A will receive flows from both the south detention pond and from Basin OS3.

Comparison of Peak Runoff for the 100-year Event					
Proposed Sub-Basins/s	**Corresponding Historic Basin**	**Routed Historic Peak Runoff (cfs)**	**Routed Proposed Peak Runoff (cfs)**	**Change in Peak Runoff (cfs)**	**Comments**
A1-A10 & R1-R2	H1	13.5	11.70	1.8 Decrease	Peak runoff controlled through outlet structure
OS1	H1	13.5	11.40	2.1 Decrease	Undetained, directed through grass swale to provide WQ
B1-B9 & R3	H2A	6.6	5.3	1.3 Decrease	Peak runoff controlled through outlet structure
OS3	H2A	6.6	3.51	3.1 Decrease	Runoff may bypass exist catch basin at HS and flow west to the exist irrigation ditch

JVA Incorporated
1512 Larimer Street, S 710
Denver, CO 80202
Ph: (303) 444 1951

Job Name: St. Vrain Valley PK-8 School
Job Number: 2563c
Date: 3/3/17
By: WTP/SW

St. Vrain Valley PK-8 School

Developed Storm Runoff Calculations

Design Storm : **100 Year**

Point Hour Rainfall (P_1) : **2.70**

	Direct Runoff							Total Runoff				Pipe				
Basin Name	Design Point	Area (ac)	Runoff Coeff	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Total tc (min)	ΣC*A (ac)	I (in/hr)	Q (cfs)	Pipe Size (in) or equivalent	Pipe Material	Slope (%)	Pipe Flow (cfs)	Max Pipe Capacity (cfs)
A11	11	0.11	0.62	8.00	0.07	7.93	0.56					8 in	PVC	1.3%	0.6	1.9
							Total to DP11	8.00	0.07	7.94	**0.56**					
R1	R1	1.01	0.91	8.10	0.92	7.90	7.27					10 in	PVC	0.1%	7.3	1.0
							Total from R1	8.10	0.92	7.90	7.27					
A7a	7a	0.12	0.91	5.00	0.11	9.15	0.97					15 in	PVC	1.0%	8.8	9.0
							Total from Basin A7a	5.00	0.11	9.16	0.97					
							Total from R1				7.27					
							Total from DP11				0.56					
							Total to DP7a				**8.80**					
R2	R2	0.72	0.91	7.70	0.65	8.04	5.26					10 in	PVC	7.8%	5.3	8.5
							Total from R2	7.70	0.65	8.04	5.26					
A7b	7b	0.71	0.58	11.10	0.41	7.00	2.88					24 in	PVC	1.0%	16.9	31.6
							Total from Basin A7b	11.10	0.41	7.00	2.88					
							Total from R2				5.26					
							Total to DP7b				**16.94**					
A12	12	0.97	0.57	12.10	0.55	6.75	3.70					30 in	PVC	1.3%	20.6	64.0
							Total from Basin A12	12.10	0.55	6.75	3.71					
							Total to DP12				**20.65**					
A8-S	8S	0.86	0.53	11.70	0.45	6.85	3.09					30 in	PVC	1.3%	23.7	64.0
							Total from Basin A8-S	11.70	0.45	6.85	3.09					
							Total to DP8S				**23.74**					
A10	10	0.10	0.65	10.50	0.06	7.16	0.45					6 in	PVC	6.2%	0.4	1.9
							Total from Basin A10	10.50	0.06	7.16	0.45					
A6	6	0.81	0.66	12.10	0.53	6.75	3.60					30 in	PVC	1.3%	27.8	64.0
							Total from Basin A6	12.10	0.53	6.75	3.60					
							Total from DP8S				*23.74*					
							Total to DP6				**27.79**					
A8-N	8N	0.86	0.53	11.80	0.45	6.82	3.07					36 in	RCP	1.3%	30.9	80.1
							Total from Basin A8-N	11.80	0.45	6.83	3.08					
							Total to DP8N				**30.86**					
A5	5	0.39	0.68	11.00	0.27	7.02	1.86					36 in	RCP	1.3%	32.7	80.1
							Total from Basin A5	11.00	0.27	7.03	1.87					
							Total to DP5				**32.73**					

JVA Incorporated
1512 Larimer Street, S 710
Denver, CO 80202
Ph: (303) 444 1951

Job Name: St. Vrain Valley PK-8 School
Job Number: 2563c
Date: 3/3/17
By: WTP/SW

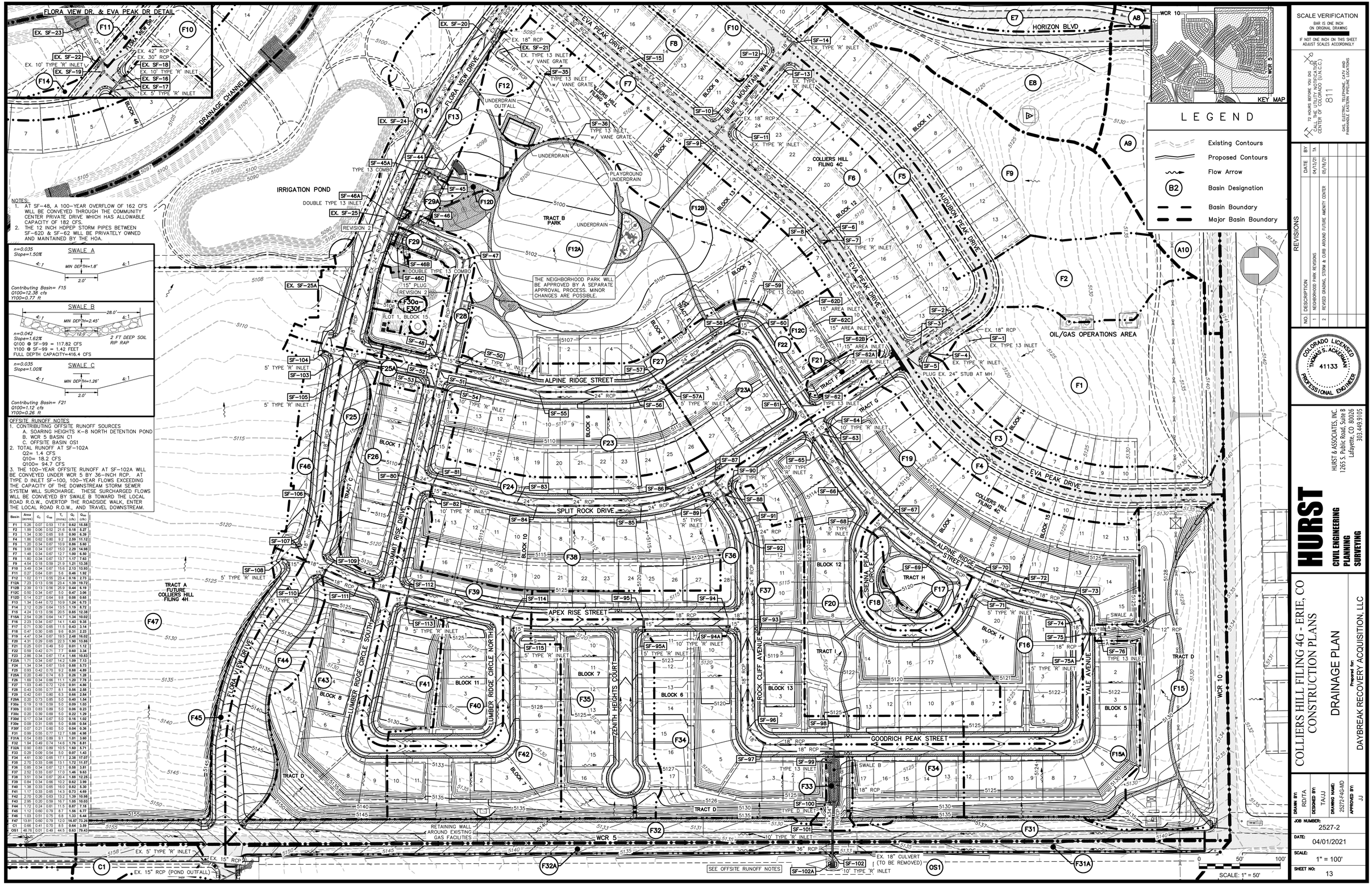
St. Vrain Valley PK-8 School

Developed Storm Runoff Calculations

Design Storm : **100 Year**

Point Hour Rainfall (P_1) : **2.70**

	Direct Runoff							Total Runoff				Pipe				
Basin Name	Design Point	Area (ac)	Runoff Coeff	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Total tc (min)	ΣC*A (ac)	I (in/hr)	Q (cfs)	Pipe Size (in) or equivalent	Pipe Material	Slope (%)	Pipe Flow (cfs)	Max Pipe Capacity (cfs)
						Perimeter drain outfall					0.20					
						Total to DP5p					**32.93**					
A2	2	0.41	0.82	9.80	0.33	7.36	2.45					36 in	RCP	1.0%	35.4	71.6
						Total from Basin A2		9.80	0.33	7.36	2.45					
						Total to DP2					**35.38**					
A4	4	0.60	0.63	10.70	0.38	7.10	2.68					12 in	PVC	6.4%	2.7	12.6
						Total from Basin A4		10.70	0.38	7.11	2.68					
						Total to DP4					**38.06**					
A3	3	0.89	0.65	11.90	0.58	6.80	3.93					36 in	RCP	1.0%	42.0	71.6
						Total from Basin A3		11.90	0.58	6.80	3.94					
						Total to DP3					**41.99**					
A9	9	0.21	0.89	6.80	0.19	8.37	1.57					12 in	RCP	1.0%	1.6	3.8
						Total from Basin A9		6.80	0.19	8.38	1.58					
						Total to DP9					**1.58**					
A1	1	0.73	0.51	11.80	0.37	6.82	2.54					21 in	PVC	0.5%	12.9	15.6
						Total from Basin A1		11.80	0.37	6.83	2.54					
						Total from DP3					*41.99*					
						Total from DP4					*1.58*					
						Total to North Pond					**46.11**					
						North Pond Release Rate					**11.70**					
C1	30	0.66	0.74	8.20	0.49	7.86	3.85					15 in	RCP	0.8%	3.9	6.3
						Total from Basin C1		8.20	0.49	7.87	3.85					
OS1	OS1	3.13	0.59	15.00	1.86	6.12	11.38									
						Total from Basin OS1		15.00	1.86	6.13	11.40					
						Total to North Storm Ditch					**26.96**					
B8	28	0.05	0.54	10.10	0.03	7.27	0.21					8 in	PVC	2.0%	0.2	2.4
						Total from Basin B8		10.10	0.03	7.28	0.21					
						Total to DP28					**0.21**					
B7	27	1.40	0.64	13.10	0.89	6.52	5.83					12 in	PVC	2.5%	6.0	7.9
						Total from Basin B7		13.10	0.89	6.52	5.84					
						Total to DP27					**6.05**					
B6	26	0.21	0.60	5.00	0.13	9.15	1.18					24 in	PVC	2.0%	7.2	44.7



NOTES:
1. AT SF-48, A 100-YEAR OVERFLOW OF 162 CFS WILL BE CONVEYED THROUGH THE COMMUNITY CENTER PRIVATE DRIVE WHICH HAS ALLOWABLE CAPACITY OF 182 CFS.
2. THE 12 INCH HDPEP STORM PIPES BETWEEN SF-62D & SF-62 WILL BE PRIVATELY OWNED AND MAINTAINED BY THE HOA.

SWALE A
n=0.035
Slope=1.50%
4:1 — MIN DEPTH=1.8' — 4:1
2.0'
Contributing Basin= F15
Q100=12.38 cfs
Y100=0.77 ft

SWALE B
4:1 — MIN DEPTH=2.45' — 4:1
28.0'
12.0'
2 FT DEEP SOIL RIP RAP
n=0.042
Slope=1.62%
Q100 @ SF-99 = 117.82 CFS
Y100 @ SF-99 = 1.42 FEET
FULL DEPTH CAPACITY=416.4 CFS

SWALE C
n=0.035
Slope=1.00%
4:1 — MIN DEPTH=1.26' — 4:1
2.0'
Contributing Basin= F21
Q100=1.12 cfs
Y100=0.26 ft

OFFSITE RUNOFF NOTES
1. CONTRIBUTING OFFSITE RUNOFF SOURCES
   A. SOARING HEIGHTS K-8 NORTH DETENTION POND
   B. WCR 5 BASIN C1
   C. OFFSITE BASIN OS1
2. TOTAL RUNOFF AT SF-102A
   Q2= 1.4 CFS
   Q10= 18.2 CFS
   Q100= 94.7 CFS
3. THE 100-YEAR OFFSITE RUNOFF AT SF-102A WILL BE CONVEYED UNDER WCR 5 BY 36-INCH RCP. AT TYPE D INLET SF-100, 100-YEAR FLOWS EXCEEDING THE CAPACITY OF THE DOWNSTREAM STORM SEWER SYSTEM WILL SURCHARGE. THESE SURCHARGED FLOWS WILL BE CONVEYED BY SWALE B TOWARD THE LOCAL ROAD R.O.W., OVERTOP THE ROADSIDE WALK, ENTER THE LOCAL ROAD R.O.W., AND TRAVEL DOWNSTREAM.

Basin	Area (acres)	C_2	C_{100}	T_c (mins)	Q_2 (cfs)	Q_{100} (cfs)
F1	5.26	0.07	0.53	17.8	0.62	15.58
F2	1.99	0.06	0.52	21.6	0.18	5.27
F3	1.34	0.30	0.65	9.8	0.90	6.39
F4	1.86	0.62	0.80	9.2	2.59	11.12
F5	1.20	0.34	0.67	10.9	0.66	5.62
F6	3.68	0.34	0.67	15.0	2.29	14.58
F7	1.48	0.34	0.67	12.7	1.00	6.50
F8	1.80	0.34	0.67	13.7	1.17	7.63
F9	4.54	0.18	0.59	21.9	1.21	13.35
F10	3.49	0.34	0.67	15.6	2.13	13.93
F11	0.27	0.64	0.81	5.6	0.46	1.92
F12	1.02	0.11	0.55	23.4	0.16	2.73
F12A	7.23	0.13	0.59	23.4	1.39	19.72
F12B	2.39	0.13	0.56	25.9	0.44	6.19
F12C	0.50	0.34	0.67	5.0	0.47	3.06
F12D	0.14	0.27	0.64	9.8	0.08	0.62
F13	1.34	0.44	0.72	10.9	1.24	6.73
F14	2.12	0.29	0.64	13.5	1.19	8.77
F15	4.24	0.13	0.56	20.5	0.85	12.38
F15A	2.54	0.28	0.64	14.7	1.24	10.02
F16	2.23	0.34	0.67	14.1	1.43	9.35
F17	0.71	0.30	0.65	11.5	0.43	3.14
F18	0.47	0.30	0.65	9.6	0.31	2.23
F19	4.47	0.34	0.67	19.5	2.48	16.02
F20	4.31	0.29	0.65	22.3	1.90	13.86
F21	0.25	0.01	0.49	5.0	0.01	1.12
F22	0.59	0.42	0.71	7.7	0.60	3.34
F23	2.66	0.34	0.67	17.4	1.66	10.83
F23A	1.71	0.34	0.67	14.2	1.09	7.13
F24	1.34	0.34	0.67	13.6	0.88	5.73
F25	0.93	0.42	0.70	9.2	0.88	4.89
F25A	0.20	0.49	0.74	6.3	0.26	1.28
F26	1.69	0.34	0.66	11.1	1.20	7.78
F27	1.03	0.45	0.72	12.6	0.91	4.66
F28	0.43	0.55	0.77	8.1	0.56	2.58
F29	0.42	0.61	0.80	6.3	0.66	2.64
F29A	0.20	0.73	0.85	5.0	0.40	1.54
F30a	0.19	0.18	0.59	5.0	0.09	1.03
F30b	0.03	0.83	0.89	5.0	0.06	0.23
F30c	0.20	0.39	0.69	5.0	0.22	1.29
F30d	0.17	0.34	0.67	5.0	0.16	1.02
F30e	0.09	0.31	0.65	5.0	0.08	0.54
F30f	0.07	0.21	0.60	5.0	0.04	0.36
F31	0.99	0.55	0.77	12.7	1.08	4.66
F31A	0.54	0.83	0.89	9.1	1.01	3.60
F32	1.94	0.49	0.74	14.6	1.76	8.81
F32A	0.90	0.83	0.89	10.5	1.60	5.71
F33	0.29	0.09	0.54	5.0	0.07	1.43
F34	4.61	0.30	0.65	17.1	2.38	17.07
F35	2.70	0.33	0.66	13.1	1.72	11.57
F36	0.85	0.34	0.67	12.1	0.58	3.81
F37	2.52	0.33	0.67	17.0	1.46	9.63
F38	3.51	0.34	0.67	20.4	1.88	12.25
F39	0.84	0.34	0.66	10.2	0.62	3.90
F40	1.38	0.33	0.65	16.0	0.82	5.30
F41	1.17	0.33	0.65	14.3	0.73	4.69
F42	2.70	0.26	0.63	15.3	1.39	10.08
F43	2.95	0.20	0.59	16.7	1.05	10.03
F44	1.72	0.24	0.61	11.5	0.87	7.12
F45	1.12	0.60	0.79	8.7	1.56	6.77
F46	1.03	0.51	0.75	6.8	1.33	6.44
F47	13.81	0.60	0.79	12.0	16.87	73.20
C1	0.66	0.41	0.70	8.5	0.64	3.59
OS1	48.76	0.01	0.49	44.5	0.83	79.43

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

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
ALSO, ELECTRIC, TELEPHONE, CATV AND PRIVATELY OWNED UTILITY LOCATIONS

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	NEIGHBORHOOD PARK REVISIONS	04/13/21	TA
2	REVISED GRADING, STORM & GSRB AROUND FUTURE AMENITY CENTER	05/18/21	

COLORADO LICENSED THOMAS S. ACKERMAN 41133 PROFESSIONAL ENGINEER

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

HURST
CIVIL ENGINEERING
PLANNING
SURVEYING

COLLIERS HILL FILING 4G - ERIE, CO
CONSTRUCTION PLANS

DRAINAGE PLAN

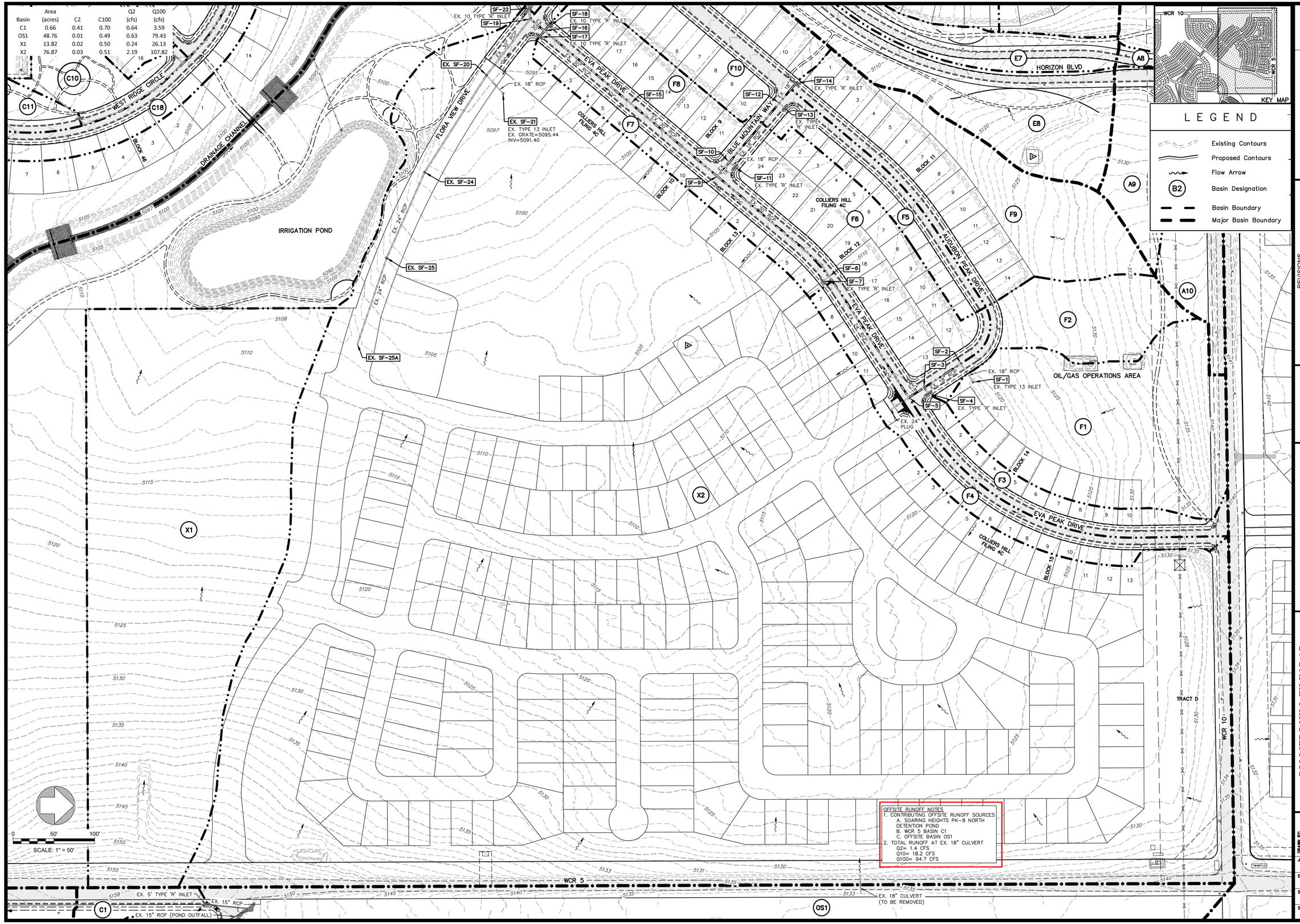
Prepared for:
DAYBREAK RECOVERY ACQUISITION, LLC

DRAWN BY: RD/TA
DESIGNED BY: TA/JJ
DRAWING NAME: 25272-FIG-MD
APPROVED BY: JJ

JOB NUMBER: 2527-2
DATE: 04/01/2021
SCALE: 1" = 100'
SHEET NO: 13

LAST SAVED: 5/24/2021 1:22 PM
G:\25272\CONST-F4G\25272-F4G-MD.dwg

Basin	Area (acres)	C2	C100	Q2 (cfs)	Q100 (cfs)
C1	0.66	0.41	0.70	0.64	3.59
OS1	48.76	0.01	0.49	0.63	79.43
X1	13.82	0.02	0.50	0.24	26.13
X2	76.87	0.03	0.51	2.19	107.82



OFFSITE RUNOFF NOTES:
1. CONTRIBUTING OFFSITE RUNOFF SOURCES
   A. SOARING HEIGHTS PK-8 NORTH DETENTION POND
   B. WCR 5 BASIN C1
   C. OFFSITE BASIN OS1
2. TOTAL RUNOFF AT EX. 18" CULVERT
   Q2= 1.4 CFS
   Q10= 18.2 CFS
   Q100= 94.7 CFS

0 50' 100'
SCALE: 1" = 50'

LEGEND

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

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 PANHANDLE EASTERN PIPELINE LOCATIONS

REVISIONS

NO.	DESCRIPTION	DATE	BY

HURST
CIVIL ENGINEERING
PLANNING
SURVEYING

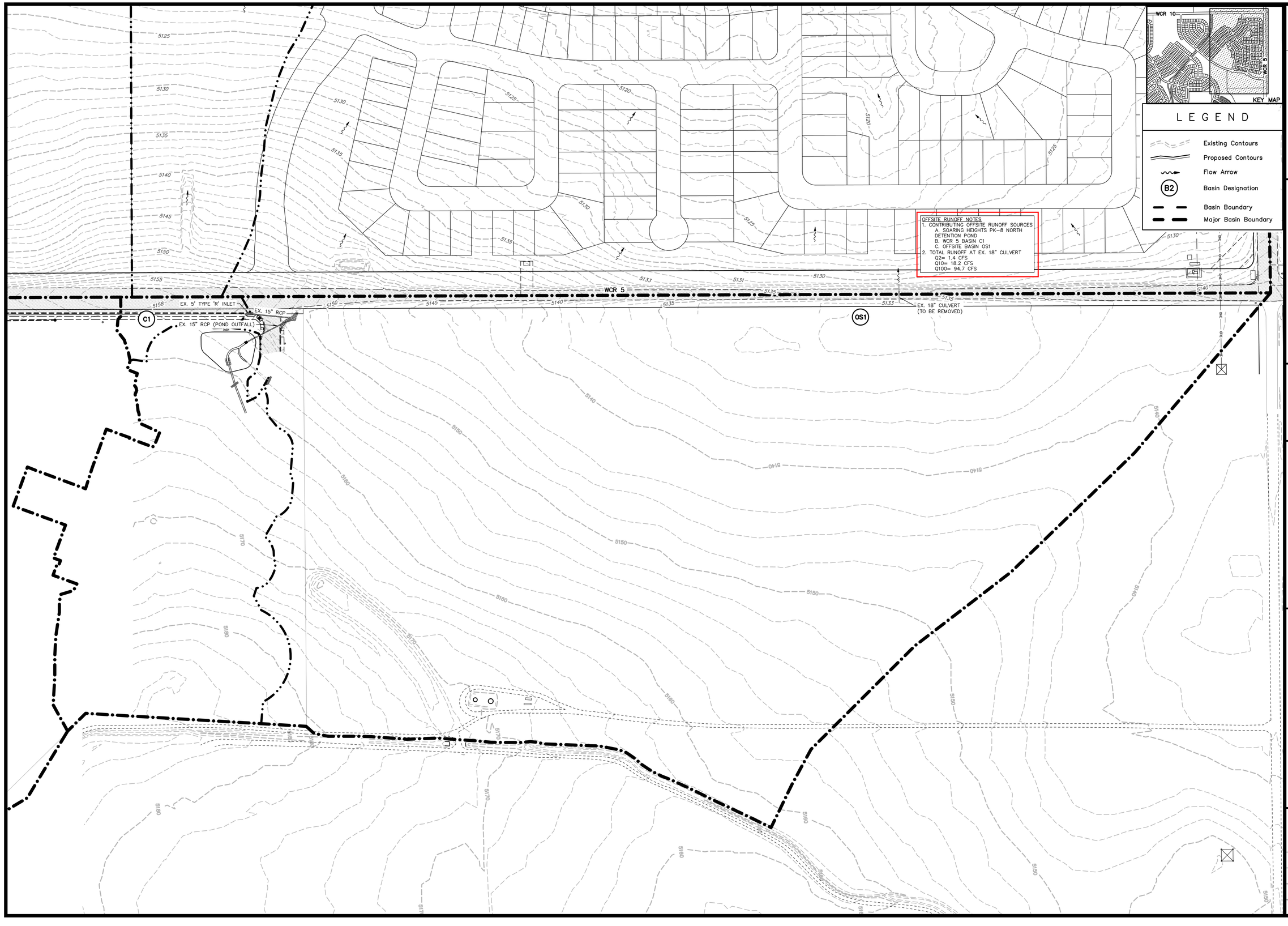
HURST & ASSOCIATES, INC.
1265 S. Public Road, Suite B
Lafayette, CO 80026
303.449.9105

COLLIERS HILL FILING 4G
PHASE III DRAINAGE REPORT
EXISTING DRAINAGE EXHIBIT

Prepared for:
DAYBREAK RECOVERY ACQUISITION, LLC

DRAWN BY:	TA
DESIGNED BY:	TA
DRAWING NAME:	25272-FIG-EX-DR
APPROVED BY:	JJ
JOB NUMBER:	2527-02
DATE:	02/15/21
SCALE:	1"=50'
SHEET NO:	1 OF 2

LAST SAVED: 4/22/2020 11:15 AM
G:\25272\PRELIM-4G\DRAINAGE SET\25272-FAG-EX-DR.dwg



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 PANHANDLE EASTERN PIPELINE LOCATIONS

NO.	DESCRIPTION	DATE	BY

REVISIONS

HURST

CIVIL ENGINEERING
PLANNING
SURVEYING

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

COLLIERS HILL FILING 4G
PHASE III DRAINAGE REPORT

EXISTING DRAINAGE EXHIBIT

Prepared for:
DAYBREAK RECOVERY ACQUISITION, LLC

DRAWN BY:	TA
DESIGNED BY:	TA
DRAWING NAME:	25272-FIG-EX-DR
APPROVED BY:	JJ
JOB NUMBER:	2527-02
DATE:	02/15/21
SCALE:	1"=50'
SHEET NO:	2 OF 2

LAST SAVED: 4/22/2020 11:15 AM

G:\25272\PRELIM-4G\DRAINAGE SET\25272-FIG-EX-DR.dwg

April 8, 2014

Mr. Gary Behlen
Director of Public Works
Town of Erie
645 Holbrook St.
Erie, Colorado 80516

CREATIVE CIVIL SOLUTION

Reference: Drainage Letter/Update Report for
Erie High School
3180 County Road 5, Erie, CO
CCS Job # 13027

Dear Gary;

Creative Civil Solutions has been hired by Klipp Architects perform Civil Engineering services for the proposed replacement of the existing onsite sidewalks that have been damaged by settlement or by movement caused by expansive soils. Our scope included modifying or replacing the existing detention pond outlet structure to provide for water quality treatment of the onsite storm runoff prior to it exiting the site.

As a part of our design, we briefly reviewed the "Final Drainage Report for Erie High School" prepared by Tetra Tech, Inc., dated July 2003 and observed that a composite "C" value was determined for the entire site and this C-value was applied to all sub-basins. Their application of the composite C-value would underestimate the runoff from sub-basins consisting of pavement and rooftops while over estimating the runoff from playfields and open space.

Regarding the sizing of the detention pond, the calculations within in 2003 Final Drainage Study provided calculations for determining the percent impervious for the school site and then applying the same impervious percentage to the entire tributary basin including the offsite agricultural field. This resulted in a detention volume that is almost double the required volume. From discussions with the school district staff, at the time of the 2003 Study, the school district were considering future expansion and improvements by the school district and wanted to have excess capacity in the detention pond for their sole future use. However, the detention pond outlet structure was sized for the 100-year allowable release rate for only the school site and an emergency overflow was not provided.

We recalculate the percent impervious of the existing 60-acre school site, taking into account that the site is comprised of both NRCS Type B & C soils and the planned future building expansion, and our percent impervious is very close to the percentage in the 2003 Study (23.64% versus 23.52% in the 2003 Study). Applying our impervious percentage to the area of the school site, the resulting required 10-year and 100-year detention volumes are 1.22 and 2.23 acre-feet respectively. The resulting Water Quality Capture Volume (WQCV) is 0.64 acre-feet. As shown on the attached pond volume calculations, the elevations corresponding to WQCV, 10-year volume and 100-year volume are 5143.52, 5144.42 and 5145.51 respectively.

The proposed replacement of the detention pond outlet structure will consist of a two bay structure. The water quality plate with orifice holes will drain the WQCV in approximately 40 hours. The horizontal opening in the outlet structure above the WQCV elevation, will provide the restriction for the 10-year storm. The first bay of the structure will have a restrictor plate to restrict the 100-year flow to the allowable release

rate. The second bay of the structure will have rim elevation that is equal to 100-year water surface elevation and will act as an overflow structure. However, the existing 42-inch outlet pipe does not have the capacity for the peak developed runoff from the school. Therefore, an emergency spillway is being proposed that will have the capacity of the peak onsite developed runoff from the school plus offsite historic offsite flows passed through the site.

The offsite runoff that is tributary to the detention pond consists of agricultural fields which have low runoff rates and large time of concentrations. The swale south of the shotput/discus and baseball fields will be regraded to channelize the offsite flows without inundating the baseball fields during large storm events. Routing the onsite runoff with the onsite runoff yields a significantly smaller peak runoff due to the higher time of concentration value. The emergency spillway was designed for the worst case scenario – the outlet structure is plugged and a 100-year storm occurs. The resulting peak runoff will be from the onsite runoff plus historic offsite runoff passé through the detention facility undetained.

With the proposed emergency spillway being at an elevation of 5147.0, there is approximately 0.53 acre-feet of excess storage volume while maintaining the 1-foot free board requirement. If the school district expands on the high school or adds another school, the outlet structure and emergency spillway can be modified to provide additional detention volume for the future improvements. If the bank and the emergency spillway is raised one-foot, there would be approximately 1.9 acre-feet of excess storage. When the adjacent parcel is privately developed, that parcel will need to provide their own detention storage and release at a rate that is no greater than the historic allowable release rate. Future offsite emergency overflow spillways shall not be allowed to discharge into, over or across St. Vrain Valley School District property, as this could cause future damage St. Vrain Valley School District property. It is recommended that the offsite parcel route developed flows down future storm drainage networks along Weld County Road 8 to Weld County Road 5, bypassing the St. Vrain Valley School District detention pond, if possible.

The detention pond outlet pipe connects to a storm manhole in County Road 5. This manhole also provides drainage for a 294 acre basin located south of County Road 8 and east of County Road 5. While we have not analyzed the existing storm system, the existing 42-inch culvert doesn't appear to have the capacity for the 100-year runoff from approximately 407 acres. With future development within the 294 acre basin, the outfall pipe from that basin should not be connected to the school outfall pipe. A separate outfall pipe should be installed.

The replacement of the existing onsite sidewalks will not impact the detention pond or downstream drainage or runoff calculations.

If you have any questions or comments, please feel free to contact me at the phone number listed below.

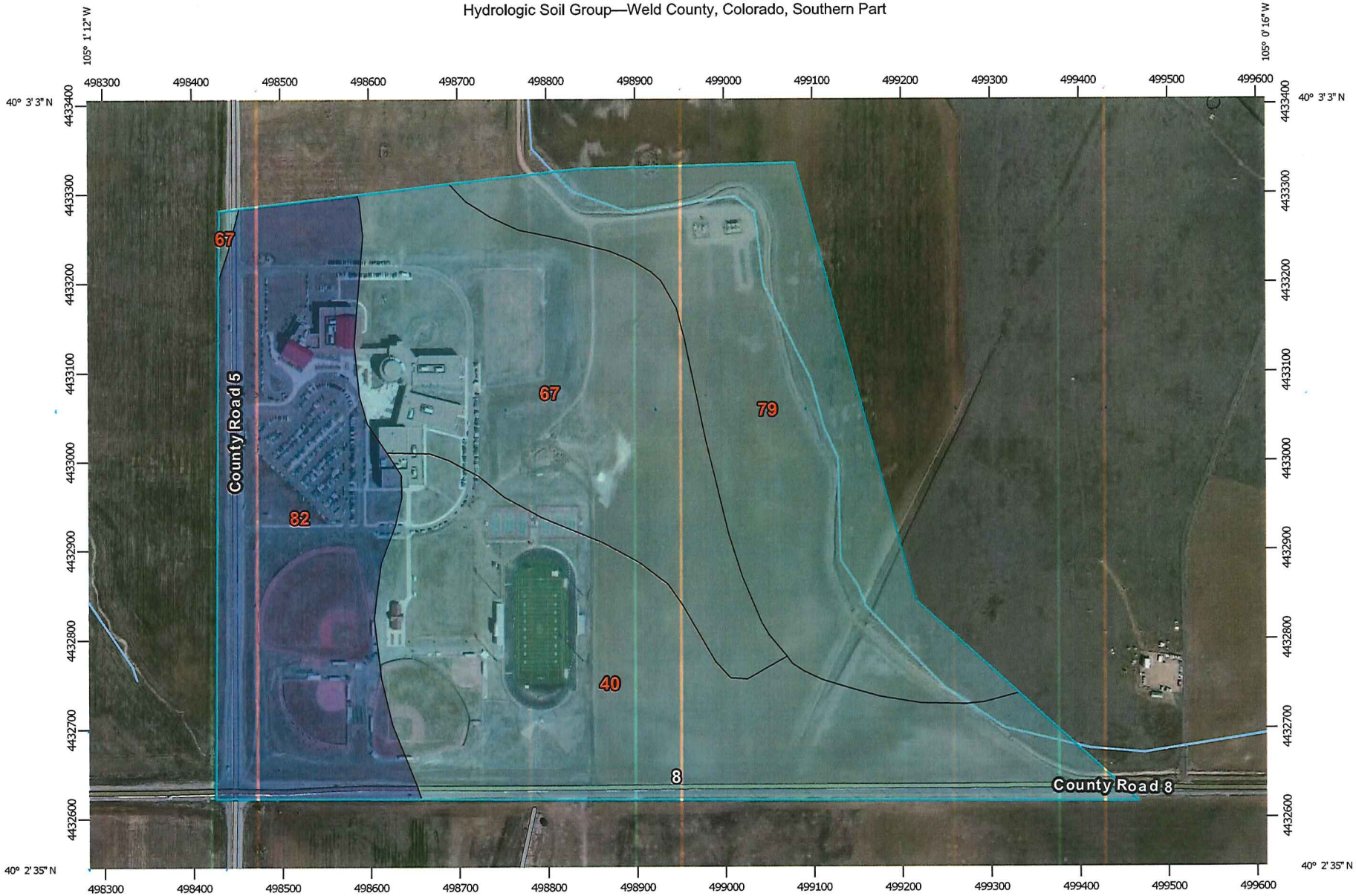
Very Truly Yours,

Curtis Kostecki

Curtis Kostecki, PE
CREATIVE CIVIL SOLUTIONS
940 Kimbark Street, Suite 2
Longmont, Colorado 80501
p: 303-684-8484
f: 303-828-4887

APPENDIX

Hydrologic Soil Group—Weld County, Colorado, Southern Part



Map Scale: 1:6,070 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

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: http://websoilsurvey.nrcs.usda.gov
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 12, Jan 3, 2014

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

Date(s) aerial images were photographed: Apr 22, 2011—Apr 13, 2012

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.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Weld County, Colorado, Southern Part (CO618)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
40	Nunn loam, 1 to 3 percent slopes	C	40.7	30.1%
67	Ulm clay loam, 3 to 5 percent slopes	C	32.6	24.1%
79	Weld loam, 1 to 3 percent slopes	C	31.8	23.6%
82	Wiley-Colby complex, 1 to 3 percent slopes	B	29.9	22.2%
Totals for Area of Interest			**135.1**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

Erie High School
Developed Composite Runoff Coefficients & Time Of Concentration Calculations

Job No 13027 Soil Type C
Minor Storm 5
Major Storm 100
By: JRL
Checked by: CWK
Date: February 18, 2014
Revised:

	Runoff Coefficients				% Impervious
	C2	C5	C10	C100	
Grass Area	0.04	0.15	0.25	0.50	0%
Paved Area	0.73	0.75	0.77	0.83	90%
Roof Area	0.73	0.75	0.77	0.83	90%
Gravel	0.28	0.35	0.42	0.58	40%

Conveyance Coefficients
Table RO-2 Type of Land Surface

Number	Type	Cv
1	Heavy Meadow	2.5
2	Tillage / Field	5
3	Short Pasture / Lawn	7
4	Near Bare Ground	10
5	Grassed Waterway	15
6	Paved Areas	20

Basin Design Data								Weighted Composite Runoff Coefficient*					Initial Overland Time $t_i=(1.8(1.1-C_5)L^{1/2}/S^{1/3}$			Travel Time t_t=Length/(Velocity x 60)						t_c Computed	t_c Urbanized Check t_c Urbanized Check		t_c Final
Design Basin	Design Point Outfall	Grass (AC)	Gravel (AC)	Paved Area (AC)	Roof Area (AC)	Area Total (AC)	% Imperv	C5	Runoff Coeff 5yr	C*A 5yr	Runoff Coeff 100yr	C*A 100yr	Upper Length (ft)	Slope (ft/ft)	t_i (min)	Conveyance Coefficient Type	Cv	Length (ft)	Slope (ft/ft)	Velocity $C_V(S_W)^{0.5}$ (fps)	t_t (min)	Time of Conc ti + tt = tc	Total Length (ft)	t_c=(L/180)+10 (min)	Min t_c (5 min)
OS-1	1	20.86	0.00	0.00	0.00	20.86	0.0%	0.15	0.15	3.129	0.50	10.430	487	0.041	109.4	6	20.0	968	0.006	1.6	10.3	119.8	1455	18.1	119.8
OS-2	2	15.46	0.00	0.61	0.00	16.07	1.9%	0.17	0.17	2.777	0.51	8.236	135	0.033	60.7	2	5.0	1630	0.020	0.7	38.4	99.1	1765	19.8	99.1
OS-3	3	14.86	0.00	0.78	0.00	15.64	2.5%	0.18	0.18	2.814	0.52	8.077	332	0.014	125.2	2	5.0	333	0.006	0.4	14.3	139.5	665	13.7	139.5
ONSITE 1	4					58.34	24.1%	0.26	0.26	15.168	0.52	30.337	171	0.012	86.4	2	5.0	471	0.019	0.7	11.4	97.8	642	13.6	13.6
ONSITE 2	5	1.65	0.00	0.00	0.00	1.65	0.0%	0.15	0.15	0.248	0.50	0.825	332	0.045	87.6	4	10.0	300	0.010	1.0	5.0	92.6	632	13.5	13.5
TOTAL ONSITE		51.18	0.00	1.39	0.00	112.56	13.7%	0.08	0.08	8.72	0.24	26.744													
						59.99	23.5%																		

Erie High School
Developed Impervious % and Composite C

Job No	13027
Minor Storm	5
Major Storm	100
By:	jrl
Checked by:	
Date:	February 28, 2014
Revised:	
Revised:	
Revised:	

Onsite

B-Soil Area	Percent Impervious	Area	I x A	% Imp	Composite C-value
Lawn	0	15.57	0		
Roof	90	1.02	91.8		
Drives and Walks	90	6.22	559.8		
Street	100	0.46	46		
Gravel	40	1.01	40.4		
Total		24.28	738	**30.40**	
C5-value					0.25
C100-value					0.47

C-Soil Area	Percent Impervious	Area	I x A	% Imp	
Lawn	0	25.36	0		
Roof	90	1.97	177.3		
Drives and Walks	90	2.17	195.3		
Gravel	40	2.26	90.4		
Tennis Courts	90	0.9	81		
Track	90	0.94	84.6		
New Building Exp	90	0.46	41.4		
Total		34.06	670	**19.67**	
C5-value					0.26
C100-value					0.55

Total Composite Imp		58.34	1408	**24.13**	
Composite C5					**0.26**
Composite C100					**0.52**
Onsite 2	0	1.65	0		
Total Onsite		59.99	1408	**23.47**	

Table RO-5— Runoff Coefficients, *C*

Percentage Imperviousness	Type C and D NRCS Hydrologic Soil Groups					
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
0%	0.04	0.15	0.25	0.37	0.44	0.50
5%	0.08	0.18	0.28	0.39	0.46	0.52
10%	0.11	0.21	0.30	0.41	0.47	0.53
15%	0.14	0.24	0.32	0.43	0.49	0.54
20%	0.17	0.26	0.34	0.44	0.50	0.55
25%	0.20	0.28	0.36	0.46	0.51	0.56
30%	0.22	0.30	0.38	0.47	0.52	0.57
35%	0.25	0.33	0.40	0.48	0.53	0.57
40%	0.28	0.35	0.42	0.50	0.54	0.58
45%	0.31	0.37	0.44	0.51	0.55	0.59
50%	0.34	0.40	0.46	0.53	0.57	0.60
55%	0.37	0.43	0.48	0.55	0.58	0.62
60%	0.41	0.46	0.51	0.57	0.60	0.63
65%	0.45	0.49	0.54	0.59	0.62	0.65
70%	0.49	0.53	0.57	0.62	0.65	0.68
75%	0.54	0.58	0.62	0.66	0.68	0.71
80%	0.60	0.63	0.66	0.70	0.72	0.74
85%	0.66	0.68	0.71	0.75	0.77	0.79
90%	0.73	0.75	0.77	0.80	0.82	0.83
95%	0.80	0.82	0.84	0.87	0.88	0.89
100%	0.89	0.90	0.92	0.94	0.95	0.96
	TYPE B NRCS HYDROLOGIC SOILS GROUP					
0%	0.02	0.08	0.15	0.25	0.30	0.35
5%	0.04	0.10	0.19	0.28	0.33	0.38
10%	0.06	0.14	0.22	0.31	0.36	0.40
15%	0.08	0.17	0.25	0.33	0.38	0.42
20%	0.12	0.20	0.27	0.35	0.40	0.44
25%	0.15	0.22	0.30	0.37	0.41	0.46
30%	0.18	0.25	0.32	0.39	0.43	0.47
35%	0.20	0.27	0.34	0.41	0.44	0.48
40%	0.23	0.30	0.36	0.42	0.46	0.50
45%	0.26	0.32	0.38	0.44	0.48	0.51
50%	0.29	0.35	0.40	0.46	0.49	0.52
55%	0.33	0.38	0.43	0.48	0.51	0.54
60%	0.37	0.41	0.46	0.51	0.54	0.56
65%	0.41	0.45	0.49	0.54	0.57	0.59
70%	0.45	0.49	0.53	0.58	0.60	0.62
75%	0.51	0.54	0.58	0.62	0.64	0.66
80%	0.57	0.59	0.63	0.66	0.68	0.70
85%	0.63	0.66	0.69	0.72	0.73	0.75
90%	0.71	0.73	0.75	0.78	0.80	0.81
95%	0.79	0.81	0.83	0.85	0.87	0.88
100%	0.89	0.90	0.92	0.94	0.95	0.96

Erie High School
Rainfall Intensity

Job No 12023
Minor Storm 5
Major Storm 100
By: JRL
Checked by:
Date:
Revised:

Storm Frequency	1-hr Storm Depth inches
2-yr	1.01
5-yr	1.43
10-yr	1.73
100-yr	2.70

Basin	Tc min	Frequency Intensity $I = \frac{28.5P_1}{(10+t_c)^{.786}}$ 2-year in/hr	5-year in/hr	10-year in/hr	100-year in/hr
OS-1	119.8	0.63	0.89	1.08	1.68
OS-2	99.1	0.72	1.02	1.23	1.92
OS-3	139.5	0.56	0.80	0.96	1.50
ONSITE 1	13.6	2.40	3.40	4.11	6.42
ONSITE 2	13.5	2.41	3.41	4.12	6.43
Routed	150.4	0.53	0.75	0.91	1.42

STANDARD FORM SF-9

CALCULATED BY JRL
DATE 2/28/2014
CHECKED BY

STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

JOB NO 13027
PROJECT **Erie High School**
DESIGN STORM **5 YR**

		DIRECT RUNOFF							TOTAL RUNOFF				STREET		TRAVEL TIME - Grass			TRAVEL TIME - Paved/Pipe				
REGION	DESIGN POINT	AREA DESIGN	AREA (AC)	RUNOFF COEFF * C	C*A	tc (Min)	I (IN/HR)	Q (CFS)	tc (MIN)	I (IN/HR)	SUM(C*A) (AC)	Q (CFS)	SLOPE (%)	STREET FLOW(CFS)	Length (FT)	Velocity (FPS)	tt (MIN)	Length (FT)	Velocity (FPS)	tt (MIN)	Total tt	REMARKS
5 YR Runoff																						
Offsite																						
	1	OS-1	20.86	0.15	3.13	119.8	0.89	2.78														
	2	OS-2	16.07	0.17	2.78	99.1	1.02	2.83	119.8	0.89	5.91	5.25			966	4.00	4.03	470	6.70	1.17	5.19	
	3	OS-3	15.64	0.18	2.81	139.5	0.80	2.24							653	3.60	3.02	1971	4.20	7.82	10.84	
Onsite																						
	4	ONSITE 1	58.34	0.26	15.17	13.6	3.40	**51.58**	150.4	0.75	24.14	18.18	Total Onsite + Offsite									
	5	ONSITE 2	1.65	0.15	0.25	13.5	3.41	**0.84**	13.6	3.40	15.42	52.42	Total Onsite									

STANDARD FORM SF-9

CALCULATED BY JRL
DATE 2/28/2014
CHECKED BY

STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

JOB NO 13027
PROJECT **Erie High School**
DESIGN STORM **100 YR**

		DIRECT RUNOFF							TOTAL RUNOFF				STREET		TRAVEL TIME - Grass			TRAVEL TIME - Paved/Pipe				
REGION	DESIGN POINT	AREA DESIGN	AREA (AC)	RUNOFF COEFF * C	C*A	tc (Min)	I (IN/HR)	Q (CFS)	tc (MIN)	I (IN/HR)	SUM(C*A) (AC)	Q (CFS)	SLOPE (%)	STREET FLOW(CFS)	Length (FT)	Velocity (FPS)	tt (MIN)	Length (FT)	Velocity (FPS)	tt (MIN)	Total tt	REMARKS
100 YR Runoff																						
Offsite																						
	1	OS-1	20.86	0.50	10.43	119.8	1.68	17.52														
	2	OS-2	16.07	0.51	8.24	99.1	1.92	15.85	119.8	1.68	18.67	31.36			966	4.00	4.03	470	6.70	1.17	5.19	
	3	OS-3	15.64	0.52	8.08	139.5	1.50	12.14							653	3.60	3.02	1971	4.20	7.82	10.84	
Onsite																						
	4	ONSITE 1	58.34	0.52	30.34	13.6	6.42	**194.78**	150.4	1.42	57.08	81.18	Total Onsite + Offsite									
	5	ONSITE 2	1.65	0.50	0.83	13.5	6.43	**5.31**	13.6	6.42	31.16	**200.08**	Total Onsite									

Off-site basins max.
100-yr flow to 36" RCP

Erie High School
WQCV

Job No	13027
Minor Storm	5
Major Storm	100
By:	JRL
Checked by:	
Date:	
Revised:	

WQCV=	a((0.91i^3)-1.1i^2 + 0.78i)
	For 12 hours release, a=0.8
	For 40 hours release, a=1.0
	i=percent impervious
Volume=	(WQCV/12)A
	A=tributary catchment area (acres)

Detention Pond

I =	23.5%	
a = 1.0	1	
WQCV=	0.129281	
A =	59.99	acres
WQ Vol =	0.646295	acre-ft
WQ Vol =	**28153**	CF

Erie High School
Required Detention Volumes

Job No	13027
Minor Storm	10
Major Storm	100
By:	JRL
Checked by:	
Date:	
Revised:	

	V=KA
10 yr K=	(0.95I-1.90)/1000
100 yr K=	(1.78I-0.002I^2-3.56)/1000

Vol=	Required Volume of Pond in Cubic Feet
I=	Percent Impervious of Basin
A =	Area in Acres

10 Year Detention Volume

I=	23.5%	
A =	59.99	AC
K10=	0.0204	
Vol10=	1.224	AC-FT
Vol10=	**53299**	CF

100 Year Detention Volume

I=	23.5%	
A =	59.99	AC
K10=	0.0371	
Vol100=	2.227	AC-FT
Vol100=	**96987**	CF

Release Rate - 10-year	Area- AC	Unit Release Rate	Release Flow	
Onsite B-Soil Area	24.28	0.23	5.58	
Onsite C-Soil Area	35.71	0.30	10.71	
TOTAL			16.30	cfs

Release Rate - 100-year	Area- AC	Unit Release Rate	Release Flow	
Onsite B-Soil Area	24.28	0.85	20.64	
Onsite C-Soil Area	35.71	1.00	35.71	
TOTAL			56.35	cfs

Erie High School
Pond Volume Calculations

Job No	13027
Minor Storm	5
Major Storm	100
By:	JRL
Checked by:	CWK
Date:	February 26, 2014
Revised:	

Equation Used:

$$V = \frac{[A_1 + A_2 + \sqrt{(A_1 * A_2)}] * Depth}{3}$$

Detention Pond

Designed Area (sf)	Elevation	Area (sf)	Volume (cf)	Cumulative Volume (cf)	Cumulative Volume (ac-ft)
0	**40.2**	0	0.00	0.00	0.000
1706	**41**	1706	455	455	0.010
7595	**42**	7595	4300	4300	0.099
17225	**43**	17225	12086	16386	0.376
28130	**44**	28130	22456	38842	0.892
40558	**45**	40558	34155	72997	1.676
53579	**46**	53579	46918	119915	2.753
68146	**47**	68146	60717	180631	4.147
82359	**47.69**	82359	51847	232478	5.337

WQ Vol =	**28153**	WQ Elev =	**43.52**
10yr Det Vol =	**53299**	10yr Elev =	**44.42**
100yr Det Vol =	**96987**	100yr Elev =	**45.51**
Top of Spillway	**47**	Freeboard	**1.5**
Excess Volume with 1-foot Freeboard=			**22928**
Excess Volume Raising Bank 1-foot=			**83644**

STAGE-DISCHARGE SIZING OF THE WATER QUALITY CAPTURE VOLUME (WQCV) OUTLET

Project: Erie High School

Basin ID: Detention Pond

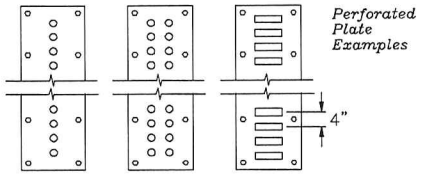
WQCV Design Volume (Input):

Catchment Imperviousness, $_a$ =	23.5	percent	Diameter of holes, D =		in.
Catchment Area, A =	59.99	acres	Number of holes per row, N =		
Depth at WQCV outlet above lowest perforation, H =	3.32	feet	OR		
Vertical distance between rows, h =	20.00	inches **			
Number of rows, NL =	2		Height of slot, H =	2.00	in.
Orifice discharge coefficient, C_o =	0.62		Width of slot, W =	4.86	in.
Slope of Basin Trickle Channel, S =	0.010	ft / ft			

Time to Drain the Pond = 40 hours

Outlet Design Information (Output):

Excess Urban Runoff Volume (From 'Full-Spectrum Sheet')	0.269	watershed inches
	N/A	
Excess Urban Runoff Volume (From 'Full-Spectrum Sheet')	**1.333**	**acre-feet**
Outlet area per row, Ao =	9.73	square inches
Total opening area at each row based on user-input above, Ao =	9.73	square inches
Total opening area at each row based on user-input above, Ao =	0.068	square feet



Perforated Plate Examples

Calculation of Collection Capacity:

Stage	Central Elevations of Rows of Holes in feet																							Σ
	Row 1	Row 2	Row 3	Row 4	Row 5	Row 6	Row 7	Row 8	Row 9	Row 10	Row 11	Row 12	Row 13	Row 14	Row 15	Row 16	Row 17	Row 18	Row 19	Row 20	Row 21	Row 22	Row 23	Flow
ft	40.28	41.95																						
(input)	Collection Capacity for Each Row of Holes in cfs																							
40.28	0.0000	0.0000																						0.00
40.38	0.1063	0.0000																						0.11
40.48	0.1503	0.0000																						0.15
40.58	0.1841	0.0000																						0.18
40.68	0.2126	0.0000																						0.21
40.78	0.2377	0.0000																						0.24
40.88	0.2604	0.0000																						0.26
40.98	0.2813	0.0000																						0.28
41.08	0.3007	0.0000																						0.30
41.18	0.3189	0.0000																						0.32
41.28	0.3362	0.0000																						0.34
41.38	0.3526	0.0000																						0.35
41.48	0.3682	0.0000																						0.37
41.58	0.3833	0.0000																						0.38
41.68	0.3978	0.0000																						0.40
41.78	0.4117	0.0000																						0.41
41.88	0.4252	0.0000																						0.43
41.98	0.4383	0.0582																						0.50
42.08	0.4510	0.1212																						0.57
42.18	0.4634	0.1612																						0.62
42.28	0.4754	0.1931																						0.67
42.38	0.4871	0.2204																						0.71
42.48	0.4986	0.2447																						0.74
42.58	0.5098	0.2668																						0.78
42.68	0.5208	0.2872																						0.81
42.78	0.5315	0.3063																						0.84
42.88	0.5420	0.3242																						0.87
42.98	0.5524	0.3412																						0.89
43.08	0.5625	0.3573																						0.92
43.18	0.5725	0.3728																						0.95
43.28	0.5823	0.3877																						0.97
43.38	0.5919	0.4020																						0.99
43.48	0.6013	0.4158																						1.02
43.58	0.6107	0.4292																						1.04
	#N/A	#N/A																						#N/A
	#N/A	#N/A																						#N/A
	#N/A	#N/A																						#N/A
	#N/A	#N/A																						#N/A
	#N/A	#N/A																						#N/A
	#N/A	#N/A																						#N/A
	#N/A	#N/A																						#N/A
	#N/A	#N/A																						#N/A
	#N/A	#N/A																						#N/A
	#N/A	#N/A																						#N/A

Erie High School
Detention Pond Orifice Calculations

Job No	13027
Minor Storm	10
Major Storm	100
By:	JRL
Checked by:	
Date:	February 28, 2014
Revised:	

Q Orifice= CA(2*g*H)^0.5
C= 0.62
A= Area (sf)
g= 32.2
H= Depth of water to center of Orifice (ft)

Detention Pond
10 Year Detention Outlet

10yr Qout=	16.30	cfs
10yr WSEL=	44.42	
Invert=	43.52	
Width of Orifice=	**96.00**	in
Area=	4.000	SF
H to Center of Orifice	0.65	FT
C=	0.62	
Q-10yr Orifice=	16.05	cfs

100 Year Detention Outlet

100yr Qout=	56.35	cfs
100yr WSEL=	45.51	
Invert=	40.10	

See UDFCD Spread Sheet

100-yr Flow thru Grate

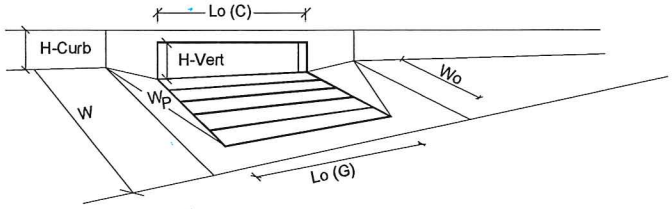
100yr Qout=	56.35	cfs
100yr WSEL=	45.51	
10 yr WSEL=	44.42	
10 Width of Orifice=	96.00	in
Area=	4.000	SF
inv=	43.52	
H to Center of Orifice	1.74	FT
C=	0.62	
Q-10 Orifice)=	CA(2*g*H)^0.5	
Q-10 Orifice)=	26.25	cfs
Q-Grate =	30.10	cfs

Using 17/8" by 4" Bar Grate
From UDFCD Spread Sheet

Depth over grate =	12.69	in
WSEL =	45.48	OK

INLET IN A SUMP OR SAG LOCATION

Project = Erie High School
Inlet ID = Detention Pond Outlet



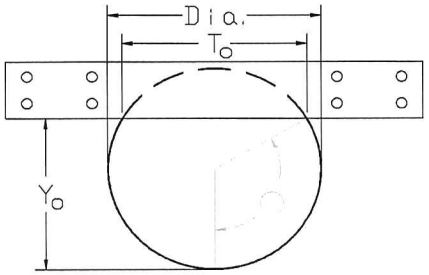
Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	1-7/8" Bar Grate, Crossbars @ 4"		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a_{local} =	0.00	0.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Grate Information		MINOR	MAJOR	
Length of a Unit Grate	L_o (G) =	8.00	8.00	feet
Width of a Unit Grate	W_o =	2.50	2.50	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.80	0.80	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 3.00)	C_w (G) =	3.00	3.00	
Grate Orifice Coefficient (typical value 0.67)	C_o (G) =	0.67	0.67	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	N/A	N/A	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	N/A	N/A	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	N/A	N/A	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	N/A	N/A	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	N/A	N/A	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	N/A	0.10	
Curb Opening Weir Coefficient (typical value 2.30-3.00)	C_w (C) =	N/A	N/A	
Curb Opening Orifice Coefficient (typical value 0.67)	C_o (C) =	N/A	N/A	
Resulting Gutter Flow Depth for Grate Inlet Capacity in a Sump		MINOR	MAJOR	
Clogging Coefficient for Multiple Units	Coef =	1.00	1.00	
Clogging Factor for Multiple Units	Clog =	0.50	0.50	
Grate as a Weir				
Flow Depth at Local Depression without Clogging (0 cfs grate, 2 cfs curb)	d_{wi} =	2.31	8.42	inches
This Row Used for Combination Inlets Only	$d_{curb\text{-}un}$ =	N/A		inches
Flow Depth at Local Depression with Clogging (0 cfs grate, 2 cfs curb)	d_{wa} =	3.04	12.69	inches
This Row Used for Combination Inlets Only	$d_{curb\text{-}cl}$ =	N/A		inches
Grate as an Orifice		MINOR	MAJOR	
Flow Depth at Local Depression without Clogging (0 cfs grate, 2 cfs curb)	d_{oi} =	1.56	2.98	inches
Flow Depth at Local Depression with Clogging (0 cfs grate, 2 cfs curb)	d_{oa} =	1.58	7.26	inches
Resulting Gutter Flow Depth Outside of Local Depression	$d_{a\text{-}Grate}$ =	3.04	12.69	**inches**
Resulting Gutter Flow Depth for Curb Opening Inlet Capacity in a Sump		MINOR	MAJOR	
Clogging Coefficient for Multiple Units	Coef =	N/A		
Clogging Factor for Multiple Units	Clog =	N/A		
Curb as a Weir, Grate as an Orifice		MINOR	MAJOR	
Flow Depth at Local Depression without Clogging (0 cfs grate, 2 cfs curb)	d_{wi} =	N/A		inches
Flow Depth at Local Depression with Clogging (0 cfs grate, 2 cfs curb)	d_{wa} =	N/A		inches
Curb as an Orifice, Grate as an Orifice		MINOR	MAJOR	
Flow Depth at Local Depression without Clogging (0 cfs grate, 2 cfs curb)	d_{oi} =	N/A		inches
Flow Depth at Local Depression with Clogging (0 cfs grate, 2 cfs curb)	d_{oa} =	N/A		inches
Resulting Gutter Flow Depth Outside of Local Depression	$d_{a\text{-}Curb}$ =	N/A		**inches**
Resultant Street Conditions		MINOR	MAJOR	
Total Inlet Length	L =	8.0	8.0	feet
Total Inlet Interception Capacity (Design Discharge from *Q-Peak*)	Q_a =	2.0	29.7	cfs
Resultant Gutter Flow Depth (based on sheet *Q-Allow* geometry)	d =	3.04	12.69	**inches**
Resultant Street Flow Spread (based on sheet *Q-Allow* geometry)	T =	4.3	25.0	**ft. >T-Crown**
Resultant Flow Depth at Street Crown	d_{CROWN} =	0.00	4.68	**inches**

RESTRICTOR PLATE SIZING FOR CIRCULAR VERTICAL ORIFICES

Project: Erie High School

Basin ID: Detention Pond

X



	#1 Vertical Orifice	#2 Vertical Orifice	
Sizing the Restrictor Plate for Circular Vertical Orifices or Pipes (Input)			
Water Surface Elevation at Design Depth — Elev: WS =	45.51		feet
Pipe/Vertical Orifice Entrance Invert Elevation — Elev: Invert =	40.10		feet
Required Peak Flow through Orifice at Design Depth — Q =	56.35		cfs
Pipe/Vertical Orifice Diameter (inches) — Dia =	36.0		inches
Orifice Coefficient — C_o =	0.65		
Full-flow Capacity (Calculated)			
Full-flow area — Af =	7.07		sq ft
Half Central Angle in Radians — Theta =	3.14		rad
Full-flow capacity — Qf =	72.9		cfs
Percent of Design Flow =	129%		
Calculation of Orifice Flow Condition			
Half Central Angle (0<Theta<3.1416) — Theta =	1.95		rad
Flow area — A_o =	5.16		sq ft
Top width of Orifice (inches) — T_o =	33.44		inches
Height from Invert of Orifice to Bottom of Plate (feet) — Y_o =	2.06		feet
Elevation of Bottom of Plate — Elev Plate Bottom Edge =	42.16		feet
Resultant Peak Flow Through Orifice at Design Depth — Q_o =	56.4		cfs
Width of Equivalent Rectangular Vertical Orifice — **Equivalent Width =**	**2.50**		**feet**
Centroid Elevation of Equivalent Rectangular Vertical Orifice — **Equiv. Centroid El. =**	**41.13**		**feet**

Erie High School
Emergency Overflow Calculations

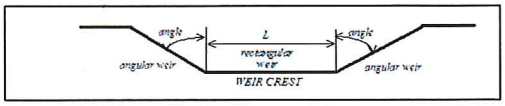
Job No	13027
Minor Storm	5
Major Storm	100
By:	JRL
Checked by:	CWK
Date:	February 26, 2014
Revised:	
Revised:	
Revised:	

Qmax=Q100= **194.78** cfs

Emergency Overflow Weir				
Q=CLH^3/2, C=3.33, Hmax=0.5ft				
Pond	Flow (cfs)	Length (ft)	Capacity (cfs)	Depth (ft)
Detention Pond	200.08	95.00	205.48	0.75

STAGE-DISCHARGE SIZING OF THE SPILLWAY

Project: Erie High School
Basin ID: Detention Pond



Design Information (input):

Bottom Length of Weir	L =	95.00	feet
Angle of Side Slope Weir	Angle =	87.14	degrees
Elev. for Weir Crest	EL. Crest =	5,147.00	feet
Coef. for Rectangular Weir	C_w =	3.30	
Coef. for Trapezoidal Weir	C_t =	3.33	

Calculation of Spillway Capacity (output):

Water Surface Elevation ft. (linked)	Rect. Weir Flowrate cfs (output)	Triangle Weir Flowrate cfs (output)	Total Spillway Release cfs (output)	Total Pond Release cfs (output)
5147.00	0.00	0.00	0.00	0.00
5147.10	9.91	0.21	10.12	10.12
5147.20	28.04	1.19	29.23	29.23
5147.30	51.51	3.29	54.80	54.80
5147.40	79.31	6.75	86.06	86.06
5147.50	110.84	11.78	122.62	122.62
5147.60	145.70	18.59	164.29	164.29
5147.70	183.61	27.33	210.93	210.93
#N/A	#N/A	#N/A	#N/A	#N/A
#N/A	#N/A	#N/A	#N/A	#N/A
#N/A	#N/A	#N/A	#N/A	#N/A

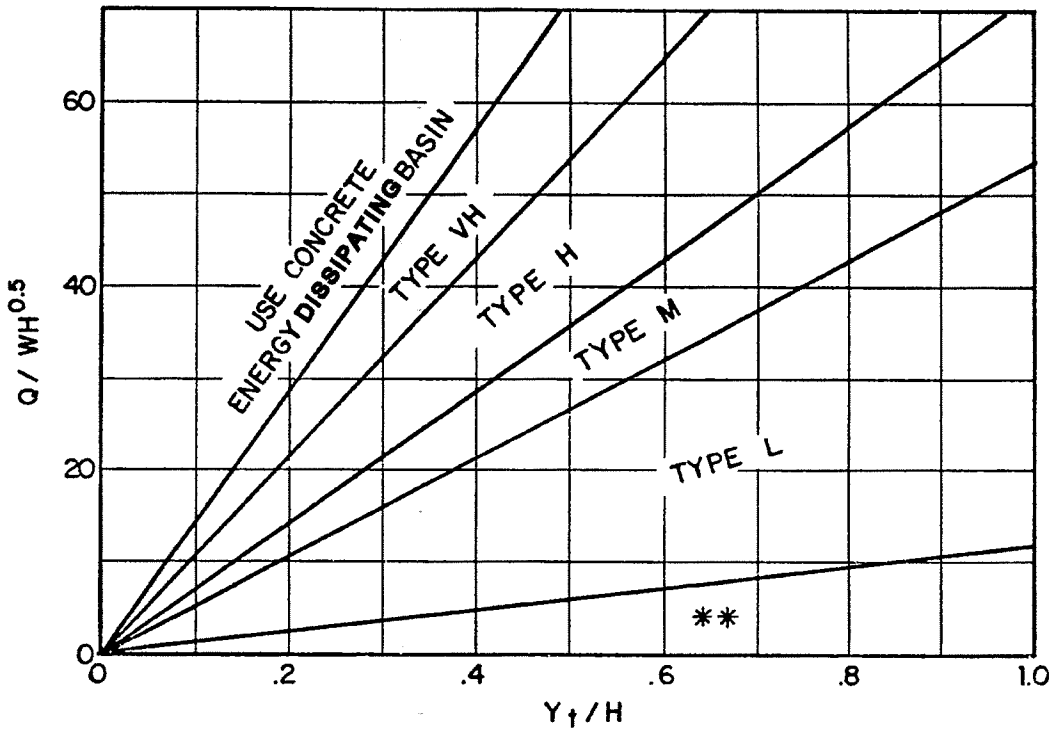
Creative Civil Solutions - Civil Engineering

Erie High School
Rip-Rap Protection Calculations

Job No 13027
Minor Storm 5
Major Storm 100
By: JRL
Checked by: CWK
Date: April 8, 2014
Revised:
Revised:
Revised:

Pipe Outlet Protection

Pipe from Design Pt.	100 yr Flow - cfs	Pipe Dia - in	Pipe Slope- %	Pipe Velocity - fps	Q/D^2.5	Q/D^1.5	Tailwater Depth -Yt	Yt/D	Type of Riprap	Expansion Factor	Length Lp
2	31.36	36	0.5	7.07	2.01	6.03	1.82	0.61	L	6.8	0.8



Use H_a instead of H whenever culvert has supercritical flow in the barrel.
**Use Type L for a distance of 3H downstream.

Figure MD-22—Riprap Erosion Protection at Rectangular Conduit Outlet Valid for $Q/WH^{1.5} \leq 8.0$

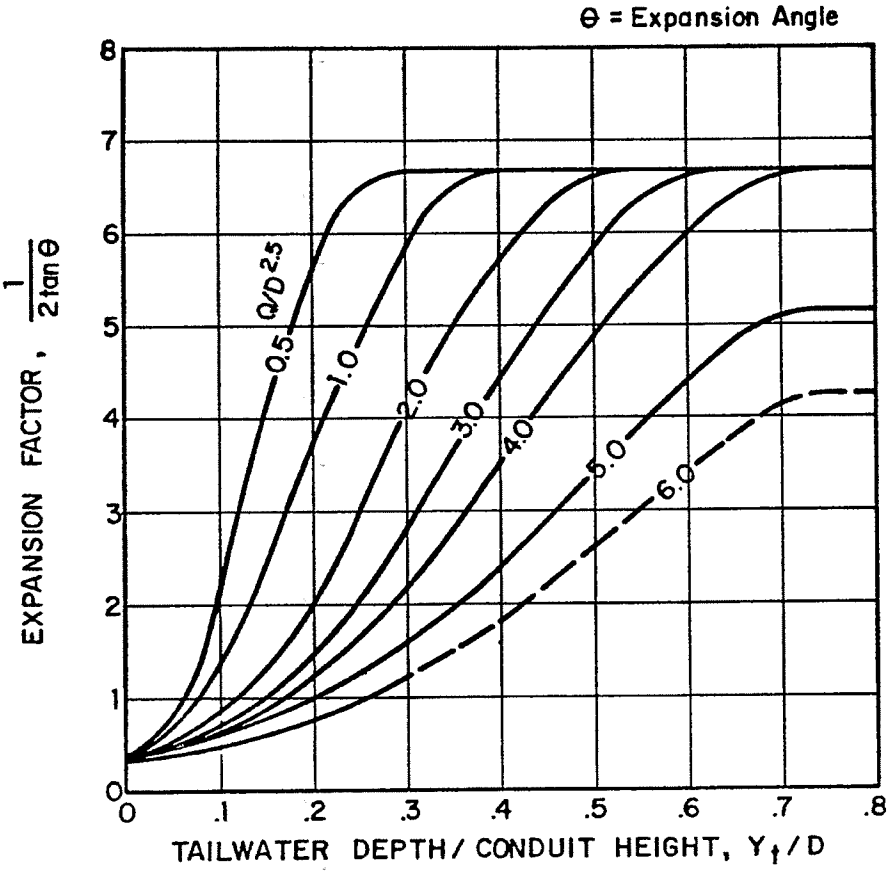
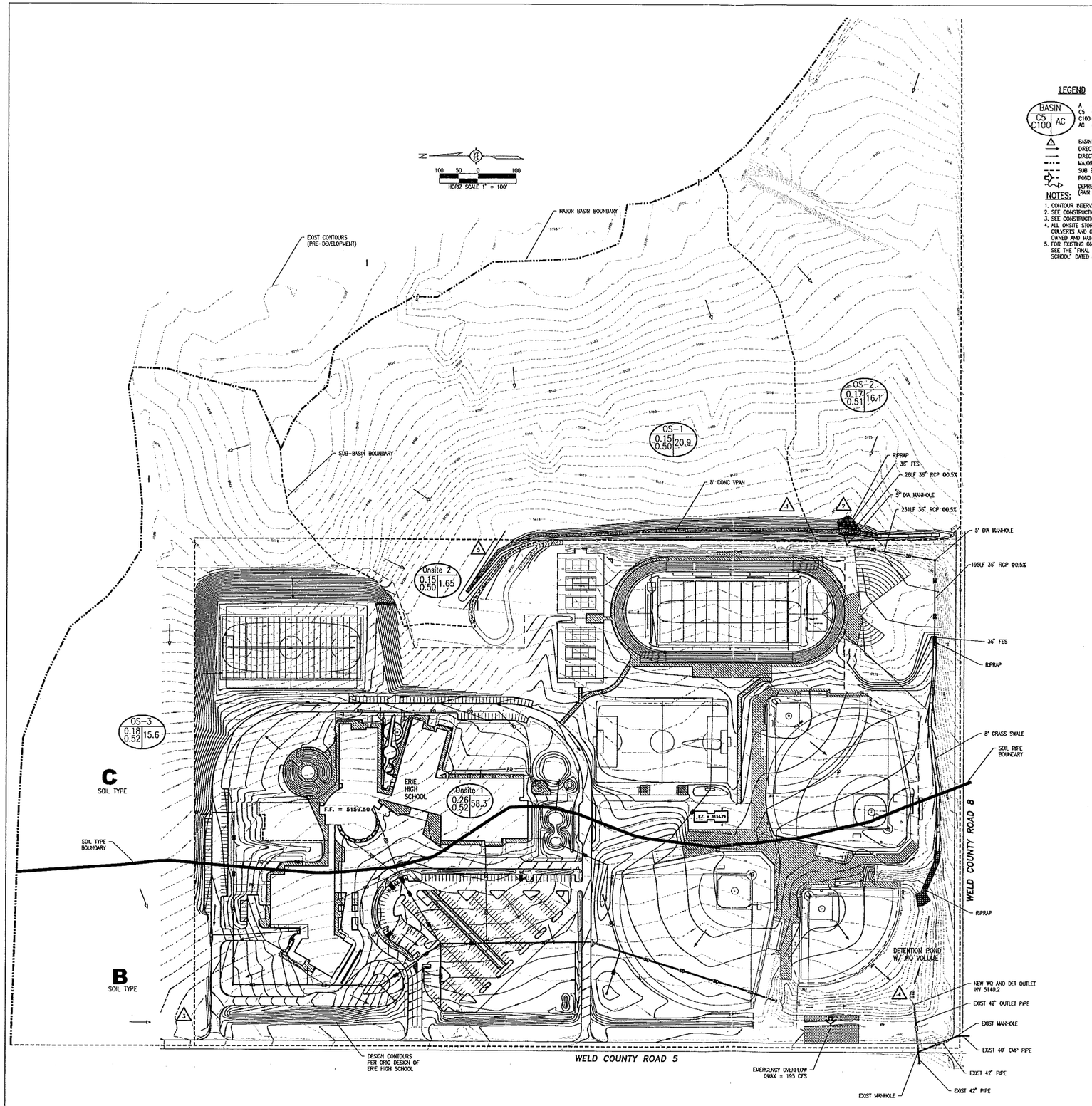


Figure MD-23—Expansion Factor for Circular Conduits



LEGEND

BASIN C5 C100 AC

A = DEVELOPED BASIN DESIGNATION
C5 = MINOR STORM RUNOFF COEFFICIENT
C100 = MAJOR STORM RUNOFF COEFFICIENT
AC = BASIN AREA ACRES

- BASIN DESIGN POINT
- DIRECTION OF FLOW (HISTORIC)
- DIRECTION OF FLOW (DEVELOPED)
- MAJOR BASIN BOUNDARY
- SUB BASIN BOUNDARY
- POND SPILLWAY OVERFLOW
- DEPRESSION STORAGE OVERFLOW LOCATION (RAIN GARDEN MATERIALS WITHIN)
- PROPERTY LINE
- 50 PROPOSED STORM DRAIN
- FLOW LINE
- RD ROOF DRAIN
- FENCE
- DESIGN INDEX CONTOURS
- DESIGN INTERMEDIATE CONTOURS
- PRE-DEVELOPED INDEX CONTOURS
- PRE-DEVELOPED INTERMEDIATE CONTOURS

NOTES:

1. CONTOUR INTERVAL = 2 FOOT
2. SEE CONSTRUCTION PLANS FOR CONSTRUCTION DETAILS
3. SEE CONSTRUCTION PLANS FOR DETENTION POND NOTES
4. ALL ONSITE STORM SEWERS, DETENTION PONDS, CULVERTS AND GRASS SWALES SHALL BE PRIVATELY OWNED AND MAINTAINED BY THE PROPERTY OWNER.
5. FOR EXISTING ONSITE STORM DRAINAGE INFORMATION SEE THE "FINAL DRAINAGE REPORT FOR ERIE HIGH SCHOOL" DATED JULY 2003, PREPARED BY TETRA TACH, INC.

DEVELOPED RUNOFF

BASIN	DESIGN POINT	Q5 (CFS)	Q100 (CFS)
OS-1	1	2.78	17.52
OS-2	2	2.83	15.85
OS-3	3	2.24	12.14
Onsite 1	4	51.58	184.8
Onsite 2	5	0.84	5.31

DETENTION SUMMARY

	WQ	10 YR	100 YR
VOLUME	28153	53299	96987
WATER SURFACE ELEV	5143.52	5144.42	5145.51
WATER DEPTH	3.32	4.22	5.31
QOUT(CFS) RELEASE RATE	N/A	16.30	56.35

klipp
a division of gkdworks
201 Broadway
Denver | Colorado 80203
t 303.893.1990
f 303.893.2204
www.klpparch.com

COPYRIGHT 2014
No part of the contents of this document may be reproduced or transmitted in any form or by any means without the written permission of gkdworks.

CREATIVE CIVIL SOLUTION
940 Kimbark Street, Suite 2
Longmont, Colorado 80501
303-684-8484

ST. VRAIN academic excellence by design

ERIE HIGH SCHOOL
Site and Courtyard Improvements
3180 County Road 5, Erie, Colorado 80516

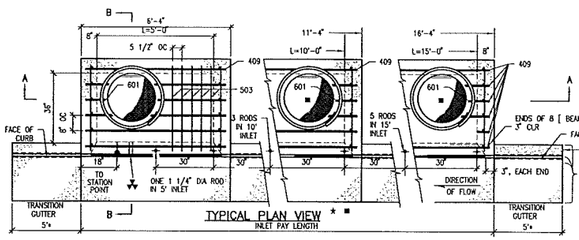
A PROJECT FOR:
ST. VRAIN VALLEY SCHOOL DISTRICT

PROJECT NUMBER: 10158-000
CCS PROJ #: 13027
DRAWN:
CHECKED:
ISSUE/REVISION
2014-04-23 ADDENDUM NO. 02

CONSTRUCTION DOCUMENTS
3 MARCH 2014

DEVELOPED DRAINAGE MAP

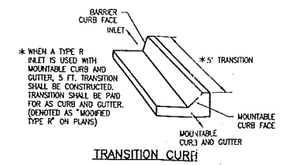
FIG 1



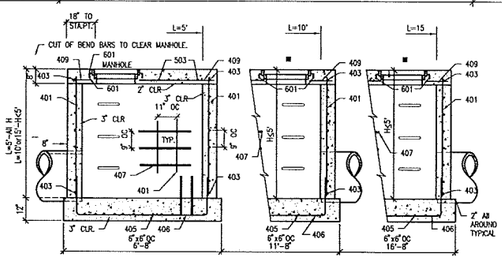
TYPICAL PLAN VIEW
INLET PAY LENGTH

★ FOR LENGTH GREATER THEN 5 FT. PROVIDE ACCESS AT BOTH ENDS.

■ ADDITIONAL MANHOLE RING AND COVER REQUIRED WHEN L=10' OR MORE. CUT REINFORCEMENT BAR ACCORDINGLY.

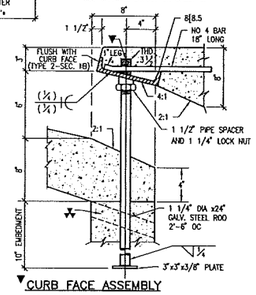


TRANSITION CURB



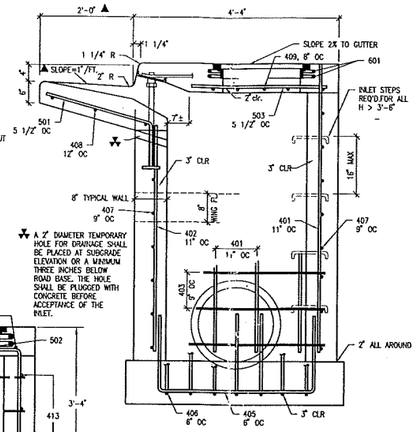
SECTION A–A REGULAR INLET

SEE CHANNEL LAYOUT ON SHEET 2.



CURB FACE ASSEMBLY
PLACE ENTIRE ASSEMBLY BEFORE POURING CONCRETE.

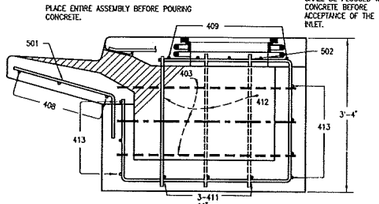
▲ – FOR A 1'-0" PAN SLOPE 2" PER FT.



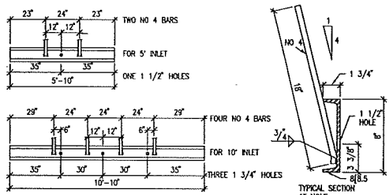
A 2" DIAMETER TEMPORARY HOLE FOR DRAINAGE SHALL BE PLACED AT SUBGRADE ELEVATION OR A MINIMUM THREE INCHES BELOW ROAD BASE. THE HOLE SHALL BE PLUGGED WITH CONCRETE BEFORE ACCEPTANCE OF THE INLET.

SECTION B–B
TYPICAL END VIEW

NOTE: MANHOLE RING & COVER, STATION POINT AND OUTFLOW PIPE SHALL BE LOCATED AT THE SAME END OF THE INLET.



SECTIONS C–C & D–D
(DOTTED BARS ARE IN SECTION D–D)

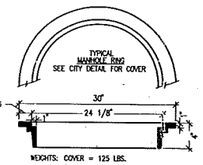


CHANNEL LAYOUT DETAILS

TYPICAL SECTION AT HOLE

GENERAL NOTES

1. ALL CONCRETE SHALL BE CLASS B. INLET MAY BE CAST-IN-PLACE OR PRECAST.
2. CONCRETE WALLS SHALL BE FORMED ON BOTH SIDES AND SHALL BE 8 IN. THICK.
3. INLET STEPS SHALL BE IN ACCORDANCE WITH AASHTO M 199.
4. CURB FACE ASSEMBLY SHALL BE GALVANIZED AFTER WELDING.
5. EXPOSED CONCRETE CORNERS SHALL BE CHAMFERED 3/4 IN. CURB AND GUTTER CORNERS SHALL BE FINISHED TO MATCH THE EXISTING CURB AND GUTTER BEYOND THE TRANSITION GUTTER.
6. REINFORCING BARS SHALL BE DEFORMED AND SHALL HAVE A 2 IN. MINIMUM CLEARANCE. ALL REINFORCING BARS SHALL BE EPOXY COATED.
7. DIMENSIONS AND WEIGHTS OF TYPICAL MANHOLE RING AND COVER ARE NOMINAL.
8. MATERIAL FOR MANHOLE RINGS AND COVERS SHALL BE GRAY OR DUCTILE CAST IRON CONFORMING TO 712.06.
9. SINCE PIPE ENTRIES INTO THE INLET ARE VARIABLE, THE DIMENSIONS SHOWN ARE TYPICAL. ACTUAL DIMENSIONS AND QUANTITIES FOR CONCRETE AND REINFORCEMENT SHALL BE AS REQUIRED IN THE WORK. QUANTITIES INCLUDE VOLUMES OCCUPIED BY PIPES.
10. STRUCTURAL STEEL SHALL BE GALVANIZED AND SHALL CONFORM TO THE REQUIREMENTS OF 712.06.



TYPICAL MANHOLE FRAME

1 TYPE R INLET DETAIL
NTS

TABLE ONE ~ BAR LIST FOR CURB INLETS, TYPE "R"

MARK	DIA IN.	O.C. SPACING	TYPE	ALL INLETS L= 5' NO.REQ'D.	ALL INLETS L= 5' LENGTH	INLETS, H ≤ 5' 10' NO.REQ'D.	INLETS, H ≤ 5' 10' LENGTH	INLETS, H ≤ 5' 15' NO.REQ'D.	INLETS, H ≤ 5' 15' LENGTH	INLETS, H > 5' 10' NO.REQ'D.	INLETS, H > 5' 10' LENGTH	INLETS, H > 5' 15' NO.REQ'D.	INLETS, H > 5' 15' LENGTH
401		1''	II	15	*	21	*	26	*	11	*	11	*
402		1''	II	7	*	13	*	18	*	7	*	7	*
403		9 ''	II	*	4'-10"	*	4'-0"	*	4'-0"	*	4'-0"	*	4'-10"
405		6 ''	VI	11	6'-10"	21	6'-10"	31	6'-10"	11	6'-10"	11	6'-10
406		6 ''	VII	7	8'-10"	7	13'-10"	7	18'-10"	7	8'-10"	7	8"-10"
407	1/2"	9 ''	II	*	5'-10"	*	10'-10	*	15'-10"	*	5'-10"	*	5"-10"
408		12"	II	3	6'-10"	3	11'-0"	3	16'-0"	3	11'-0"	3	16'-0"
409		8 ''	II	6	5'-10"	6	10'-10"	6	15'-10"	6	10'-10"	6	15"-10"
410		1''	VII							3	*	3	*
411		1''	II							3	5"-2"	3	10"-2"
412		1''	II							3	2"-9"	3	2"-9"
413		9 ''	II							7	10'-10"	7	15"-10"
501	5/8"	5 1/2"	IV	11	3'-4"	22	3'-4"	33	3'-4"	22	3'-4"	33	3'-4"
502		5 1/2"	III							11	11'-5"	17	11"-5"
503		5 1/2"	II	5	3'-6"	16	3'-6"	27	3'-6"	6	3'-6"	6	3"-6"
504		5 1/2"	IX									5	8"-4"
601	3/4"	2 1/2"	V	2	8'-10"	2	8'-10"	2	8'-10"	2	8'-10"	4	8"-10"
#8[8.5				1	5'-10"	1	10'-10"	1	15'-10"	1	10'-10"	1	15'-10"
				2BARS,1ROD	—	4BARS,3RODS	—	8BARS,5RODS	—	4BARS,3RODS	—	8BARS,5RODS	—

* VARIABLE, REFER TO TABLE TWO.
# INCLUDE 18" NO. 4 BARS (SEE CHANNEL LAYOUT DETAIL).
▼ SEE CURB FACE ASSEMBLY ON SHEET 1 AND CHANNEL LAYOUT DETAILS ON THIS SHEET.

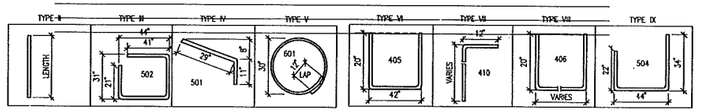
REGULAR INLETS | DROP BOX INLETS

TABLE TWO ~ BARS AND QUANTITIES VARIABLE WITH "H"

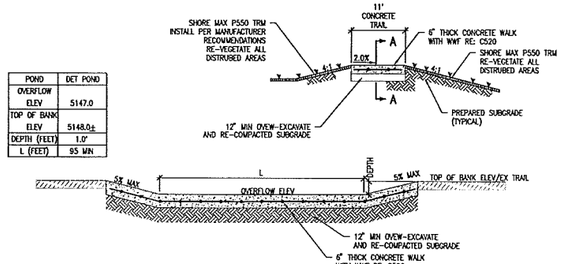
'H'	LENGTH 401	LENGTH 402	LENGTH 410	NO. REQ'D. REGULAR 403	NO. REQ'D. REGULAR 407	NO. REQ'D. DROP BOX 403	NO. REQ'D. DROP BOX 407	L=5' CU.YD.CONC.	L=5' LB.STEEL	L=10' CU.YD.CONC.	L=10' LB.STEEL	L=15' CU.YD.CONC.	L=15' LB.STEEL
3'-0"	2'-8"	1'-8"		10	7			3.2	285	5.3	497	7.4	705
3'-6"	3'-2"	2'-2"		10	7			3.4	305	5.7	528	7.9	747
4'-0"	3'-8"	2'-8"		12	9			3.7	326	6.0	559	8.4	786
4'-6"	4'-2"	3'-2"		12	9			3.9	334	6.4	571	8.8	803
5'-0"	4'-8"	3'-8"		14	11			4.1	354	6.7	602	9.3	844
5'-6"	5'-2"	4'-2"	3'-5"	16	13	15	6	4.4	375	6.0	607	7.4	850
6'-0"	5'-8"	4'-8"	3'-11"	16	13	16	6	4.6	382	6.2	616	7.6	860
6'-6"	6'-2"	5'-2"	4'-5"	18	15	18	8	4.8	402	6.4	637	7.8	880
7'-0"	6'-8"	5'-8"	4'-11"	20	17	19	10	5.0	423	6.6	654	8.0	897
7'-6"	7'-2"	6'-2"	5'-5"	20	17	20	10	5.3	430	6.9	664	8.3	907
8'-0"	7'-8"	6'-8"	5'-11"	22	19	22	12	5.5	451	7.1	684	8.5	927
8'-6"	8'-2"	7'-2"	6'-5"	24	21	23	14	5.7	471	7.3	702	8.7	944
9'-0"	8'-8"	7'-8"	6'-11"	24	21	24	14	6.0	479	7.6	711	9.0	954
9'-6"	9'-2"	8'-2"	7'-5"	26	23	26	16	6.2	499	7.8	732	9.2	974
10'-0"	9'-8"	8'-8"	7'-11"	28	25	27	18	6.4	520	8.0	749	9.4	992
10'-6"	10'-2"	9'-2"	8'-5"	28	25	28	18	6.7	527	8.3	759	9.7	1001
11'-0"	10'-8"	9'-8"	8'-11"	30	27	30	20	6.9	547	8.5	779	9.9	1022

NOTE: FOR L=5', L=10' AND L=15' REGULAR INLETS: TOTAL QUANTITIES NEEDED ARE OUTSIDE OF THE HEAVY BLACK LINE. DROP BOX INLETS: TOTAL QUANTITIES NEEDED ARE INSIDE OF THE HEAVY BLACK LINE

STEEL WEIGHTS DO NOT INCLUDE STRUCTURAL STEEL.

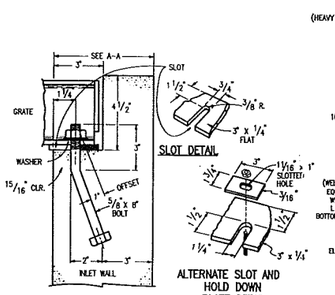


BAR BENDING DIAGRAMS ~ (Dimensions are Out-to-Out of bar)



SECTION A–A

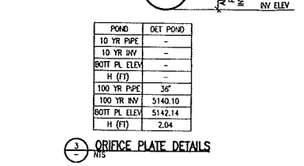
2 POND SPILLWAY DETAIL
NTS



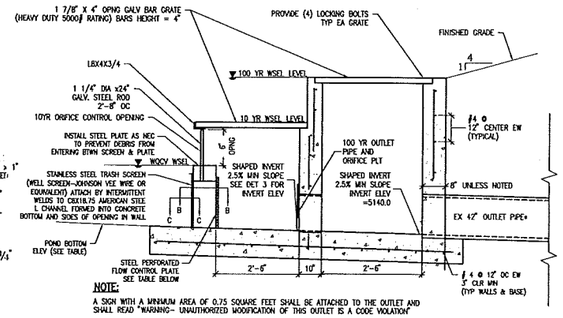
SLOT DETAIL

GRATE INSTALLATION DETAIL

ALTERNATE SLOT AND HOLD DOWN PLATE DETAIL

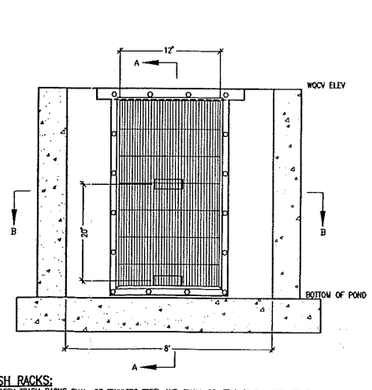


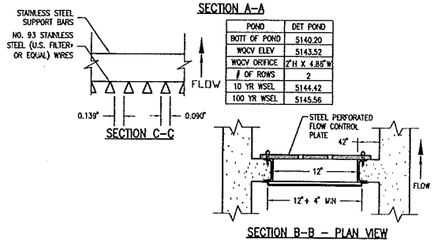
3 ORIFICE PLATE DETAILS
NTS



NOTE:
A SIGN WITH A MINIMUM AREA OF 0.75 SQUARE FEET SHALL BE ATTACHED TO THE OUTLET AND SHALL READ "WARNING– UNAUTHORIZED MODIFICATION OF THIS OUTLET IS A CODE VIOLATION"

SECTION A–A





SECTION C–C

SECTION B–B – PLAN VIEW

4 DETENTION POND OUTLET STRUCTURE DETAILS
NTS

WQCV TRASH RACKS:

1. WELL-SCREEN TRASH RACKS SHALL BE STAINLESS STEEL AND SHALL BE ATTACHED BY INTERMITTANT WELDS ALONG THE EDGE OF THE MOUNTING FRAME.
2. BAR GRATE TRASH RACKS SHALL BE ALUMINUM AND SHALL BE BOLTED USING STAINLESS STEEL HARDWARE.
3. TRASH RACK WIDTHS ARE FOR SPECIFIED TRASH RACK MATERIAL. FINER WELL-SCREEN OR MESH SIZE THAN SPECIFIED IS ACCEPTABLE, HOWEVER, TRASH RACK DIMENSIONS NEED TO BE ADJUSTED FOR MATERIALS HAVING A DIFFERENT OPEN AREA/GROSS AREA RATIO (R VALUE)
4. STRUCTURAL DESIGN OF TRASH RACK SHALL BE BASED ON FULL HYDROSTATIC HEAD WITH ZERO HEAD DOWNSTREAM OF THE RACK.

OVERFLOW TRASH RACKS:

1. ALL TRASH RACKS SHALL BE MOUNTED USING STAINLESS STEEL HARDWARE AND PROVIDED WITH HINGED AND LOCKABLE OR BOLTABLE ACCESS PANELS.
2. TRASH RACKS SHALL BE STAINLESS STEEL, ALUMINUM, OR STEEL. STEEL TRASH RACKS SHALL BE HOT DIP GALVANIZED AND MAY BE HOT POWDER PAINTED AFTER GALVANIZING.
3. TRASH RACKS SHALL BE DESIGNED SUCH THAT THE DIAGONAL DIMENSION OF EACH OPENING IS SMALLER THAN THE DIAMETER OF THE OUTLET PIPE.
4. STRUCTURAL DESIGN OF TRASH RACK SHALL BE BASED ON FULL HYDROSTATIC HEAD WITH ZERO HEAD DOWNSTREAM OF THE RACK.

klipp
a division of GK Works
201 Broadway
Denver | Colorado 80203
t 303.893.1990
f 303.893.2204
www.klipparch.com

COPYRIGHT 2014
No part of the contents of this document may be reproduced or transmitted in any form or by any means without the written permission of gkklworks.

CREATIVE CIVIL SOLUTION
940 Kimbark Street, Suite 2
Longmont, Colorado 80501
303-681-8484

ST. VRAIN
creative civil design by design

ERIE HIGH SCHOOL
Site and Courtyard Improvements
3180 County Road 5, Erie, Colorado 80516

A PROJECT FOR:
ST. VRAIN VALLEY SCHOOL DISTRICT

PROJECT NUMBER:
10158-000
CCS PROJ #: 13037
DRAWN:
CHECKED:
ISSUE/REVISION:

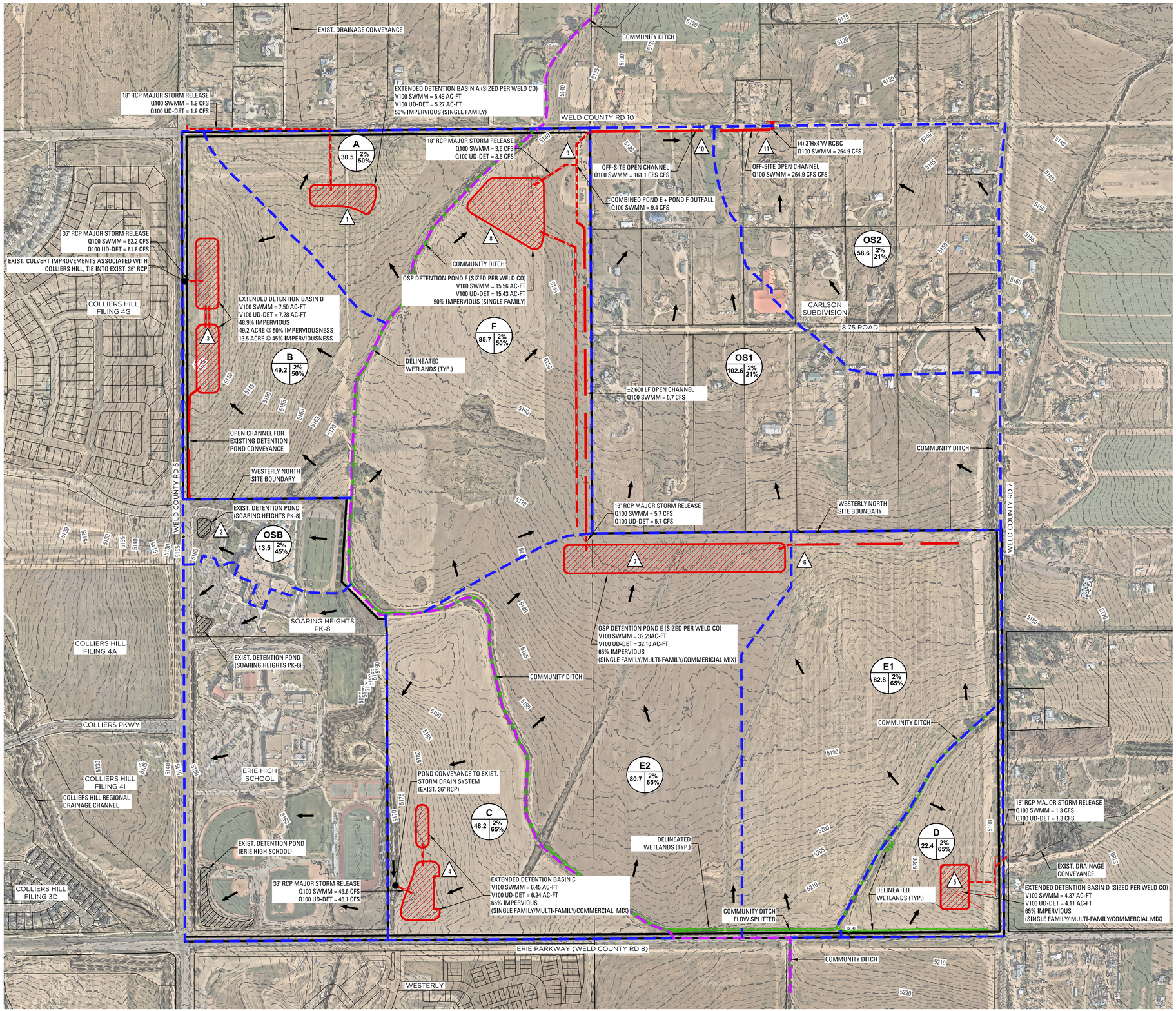
CONSTRUCTION DOCUMENTS
3 MARCH 2014

SITE DETAILS

C522

OVERALL DRAINAGE PLAN

(SEE SUBSEQUENT SHEETS FOR 1" = 100' PLANS)



DRAINAGE MAP LEGEND

- DETENTION POND IMPROVEMENT
- OPEN CHANNEL IMPROVEMENT
- STORM PIPE IMPROVEMENT
- MAJOR DRAINAGE BASIN BOUNDARY
- MINOR DRAINAGE BASIN BOUNDARY
- EXISTING DETENTION POND
- DELINEATED NON-JURISDICTIONAL WETLANDS
- DESIGN POINT
- SUB-BASIN I.D.
- HISTORIC CUHP % IMPERVIOUSNESS
- PROPOSED CUHP % IMPERVIOUSNESS
- SUB-BASIN AREA (ACRES)

DEVELOPED RUNOFF (CUHP/SWMM)

DESIGN POINT	BASIN	DIRECT RUNOFF Q2 CFS	DIRECT RUNOFF Q5 CFS	DIRECT RUNOFF Q100 CFS	ROUTED RUNOFF Q2 CFS	ROUTED RUNOFF Q5 CFS	ROUTED RUNOFF Q100 CFS
1	A	17	27	106	-	-	-
2	OSB	5	9	39	-	-	-
3	B	27	42	170	32	51	209
4	C	38	56	190	-	-	-
5	D	19	29	96	-	-	-
6	E1	57	85	288	-	-	-
7	E2	52	77	264	108	162	551
8	F	33	53	216	-	-	-
9	Pond E + F Outflow	-	-	-	3	4	9
10	OS1	11	23	160	11	23	161
11	OS2	7	16	106	18	38	265

HISTORIC RUNOFF (CUHP/SWMM)

DESIGN POINT	BASIN	DIRECT RUNOFF Q2 CFS	DIRECT RUNOFF Q5 CFS	DIRECT RUNOFF Q100 CFS	ROUTED RUNOFF Q2 CFS	ROUTED RUNOFF Q5 CFS	ROUTED RUNOFF Q100 CFS
1	A	0.4	4	57	-	-	-
2	OSB	0.1	2	22	-	-	-
3	B	0.6	7	91	0.8	8	113
4	C	0.6	7	88	-	-	-
5	D	0.3	4	47	-	-	-
6	E1	0.9	9	129	-	-	-
7	E2	0.8	8	117	1.6	17	246
8	F	0.7	7	111	-	-	-
9	E1+E2+F	-	-	-	1.9	24	355
10	OS1	0.9	10	140	1.8	27	485
11	OS2	0.6	7	93	1.8	31	571

WELD COUNTY POND SIZING CRITERIA FOR PONDS DISCHARGING TO UNINCORPORATED WELD COUNTY:
MAXIMUM DEVELOPED 100-YR POND OUTFLOWS SHALL NOT EXCEED THE 5-YR HISTORIC (UNDEVELOPED) FLOWRATE. 5-YR HISTORIC FLOWRATES WERE DETERMINED USING WELD COUNTY CRITERIA AS THE CUHP/SWMM MODEL 5-YEAR FLOWRATES WERE HIGHER IN COMPARISON. THE WELD COUNTY CALCULATIONS ARE INCLUDED IN THE APPENDIX OF THE DRAINAGE REPORT.

PEAK 100-YR POND OUTFLOWS DISCHARGING TO UNINCORPORATED WELD COUNTY SHALL BE AS FOLLOWS:

BASIN A - UNDEVELOPED 5-YR FLOWRATE = 2.0 CFS
BASIN D - UNDEVELOPED 5-YR FLOWRATE = 1.4 CFS
BASIN E - UNDEVELOPED 5-YR FLOWRATE = 6.0 CFS
BASIN F - UNDEVELOPED 5-YR FLOWRATE = 3.7 CFS

N

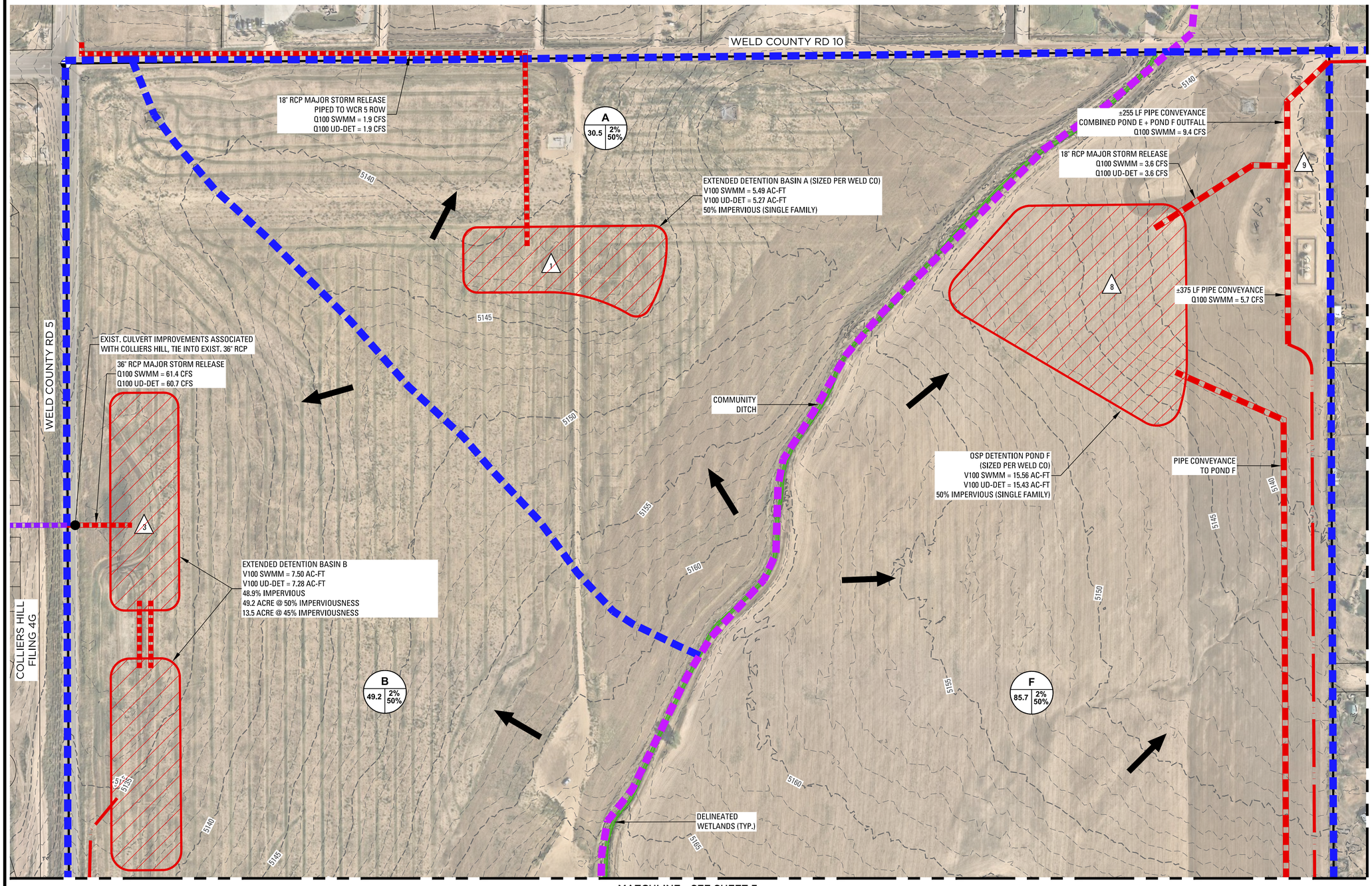
300 0 150 300 600

SCALE: 1"= 300' HORIZ.

DATE: 03/24/2025

KT ENGINEERING
ENGINEERS • SURVEYORS
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

J:\0099\2019\CIVIL\DRAINAGE\PHASE I\CAD FILES\2216-PH I-DRNI-MAP_2023-12-07.DWG



DRAINAGE MAP LEGEND

- DETENTION POND IMPROVEMENT
- OPEN CHANNEL IMPROVEMENT
- STORM PIPE IMPROVEMENT
- MAJOR DRAINAGE BASIN BOUNDARY
- MINOR DRAINAGE BASIN BOUNDARY
- EXISTING DETENTION POND
- DELINEATED WETLANDS
- DESIGN POINT
- SUB-BASIN I.D.
- HISTORIC CUHP % IMPERVIOUSNESS
- PROPOSED CUHP % IMPERVIOUSNESS
- SUB-BASIN AREA (ACRES)

WELD COUNTY POND SIZING CRITERIA FOR PONDS DISCHARGING TO UNINCORPORATED WELD COUNTY: MAXIMUM DEVELOPED 100-YR POND OUTFLOWS SHALL NOT EXCEED THE 5-YR HISTORIC (UNDEVELOPED) FLOWRATE. 5-YR HISTORIC FLOWRATES WERE DETERMINED USING WELD COUNTY CRITERIA AS THE CUHP/SWMM MODEL 5-YEAR FLOWRATES WERE HIGHER IN COMPARISON. THE WELD COUNTY CALCULATIONS ARE INCLUDED IN THE APPENDIX OF THE DRAINAGE REPORT.

PEAK 100-YR POND OUTFLOWS DISCHARGING TO UNINCORPORATED WELD COUNTY SHALL BE AS FOLLOWS:

BASIN A - UNDEVELOPED 5-YR FLOWRATE = 2.0 CFS
BASIN D - UNDEVELOPED 5-YR FLOWRATE = 1.4 CFS
BASIN E - UNDEVELOPED 5-YR FLOWRATE = 6.0 CFS
BASIN F - UNDEVELOPED 5-YR FLOWRATE = 3.7 CFS

HISTORIC RUNOFF (CUHP/SWMM)

DE SIGN POINT	BASIN	DIRECT RUNOFF Q2 CFS	DIRECT RUNOFF Q5 CFS	DIRECT RUNOFF Q100 CFS	ROUTED RUNOFF Q2 CFS	ROUTED RUNOFF Q5 CFS	ROUTED RUNOFF Q100 CFS
1	A	0.4	4	57	-	-	-
2	OSB	0.1	2	22	-	-	-
3	B	0.6	7	91	0.8	8	113
4	C	0.6	7	88	-	-	-
5	D	0.3	4	47	-	-	-
6	E1	0.9	9	129	-	-	-
7	E2	0.8	8	117	1.6	17	246
8	F	0.7	7	111	-	-	-
9	E1+E2+F	-	-	-	1.9	24	355
10	OS1	0.9	10	140	1.8	27	485
11	OS2	0.6	7	93	1.8	31	571

DEVELOPED RUNOFF (CUHP/SWMM)

DE SIGN POINT	BASIN	DIRECT RUNOFF Q2 CFS	DIRECT RUNOFF Q5 CFS	DIRECT RUNOFF Q100 CFS	ROUTED RUNOFF Q2 CFS	ROUTED RUNOFF Q5 CFS	ROUTED RUNOFF Q100 CFS
1	A	17	27	106	-	-	-
2	OSB	5	9	39	-	-	-
3	B	27	42	170	32	51	209
4	C	38	56	190	-	-	-
5	D	19	29	96	-	-	-
6	E1	57	85	288	-	-	-
7	E2	52	77	264	108	162	551
8	F	33	53	216	-	-	-
9	Pond E + F Outflow	-	-	-	3	4	9
10	OS1	11	23	160	11	23	161
11	OS2	7	16	106	18	38	265

N

100 0 50 100 200
SCALE: 1"= 100' HORIZ.

KT ENGINEERING
ENGINEERS • SURVEYORS
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

DATE SUBMITTED: 10.31.2022

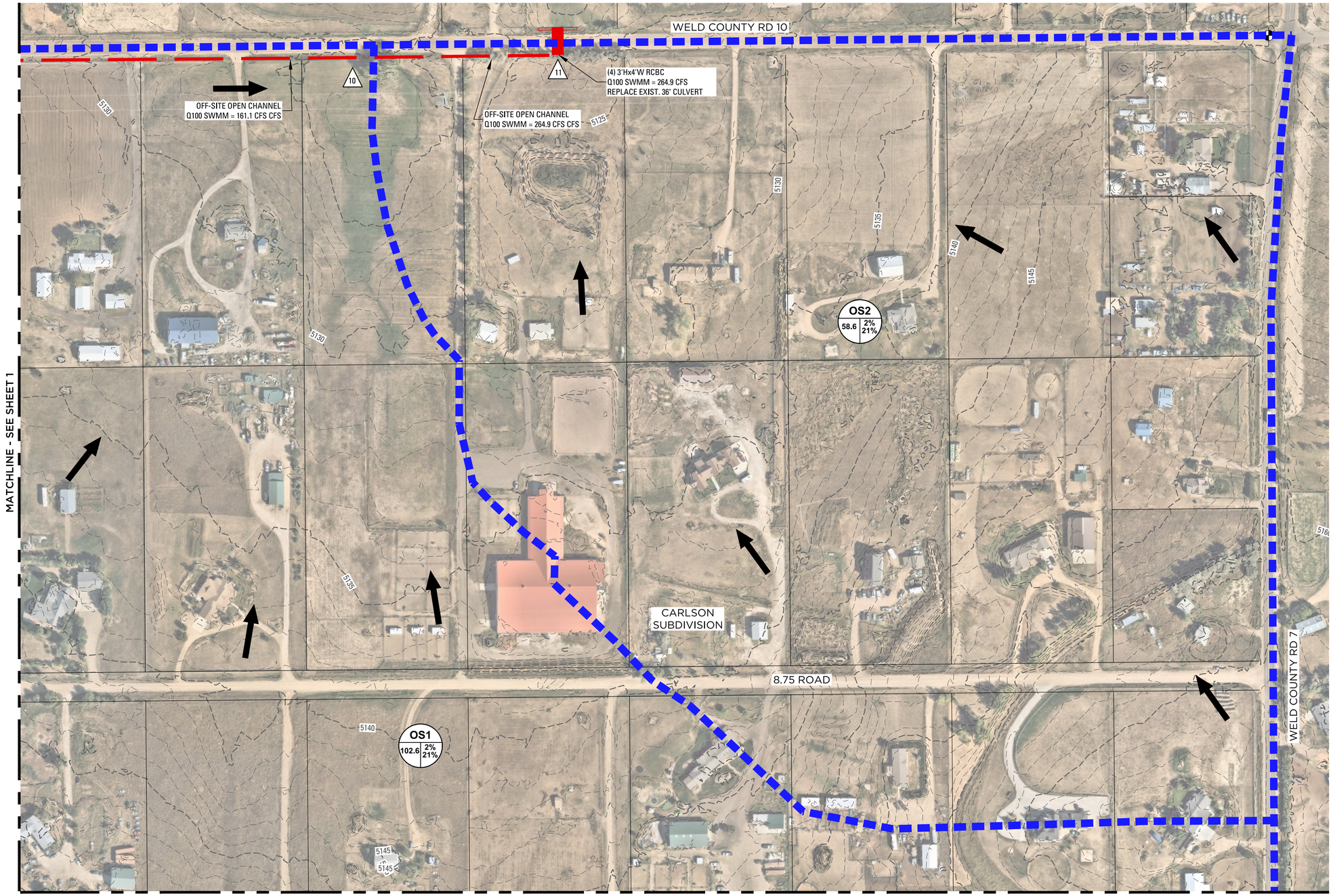
REVISION NO.	DATE
1	12.12.2023
2	06.21.2024
3	09.20.2024
4	01.30.2025
5	

PREPARED FOR:
SOUTHERN LAND CO.
3990 HILLSBORO PIKE, STE 400
NASHVILLE, TN 37215
615.778.3150

SCALE: 1" = 100' | JOB NO: 0043-1532 | BY: OKK

SHEET 1 OF 6

J:\0089221\6\CIVIL\DRAINAGE\PHASE I\CAD FILES\221X-P1-SWM-MAP-2IN36_2024-09-17.DWG



DRAINAGE MAP LEGEND

- DETENTION POND IMPROVEMENT
- OPEN CHANNEL IMPROVEMENT
- STORM PIPE IMPROVEMENT
- MAJOR DRAINAGE BASIN BOUNDARY
- MINOR DRAINAGE BASIN BOUNDARY
- EXISTING DETENTION POND
- DELINEATED WETLANDS
- DESIGN POINT
- SUB-BASIN I.D.
- HISTORIC CUHP % IMPERVIOUSNESS
- PROPOSED CUHP % IMPERVIOUSNESS
- SUB-BASIN AREA (ACRES)

WELD COUNTY POND SIZING CRITERIA FOR PONDS DISCHARGING TO UNINCORPORATED WELD COUNTY:
MAXIMUM DEVELOPED 100-YR POND OUTFLOWS SHALL NOT EXCEED THE 5-YR HISTORIC (UNDEVELOPED) FLOWRATE. 5-YR HISTORIC FLOWRATES WERE DETERMINED USING WELD COUNTY CRITERIA AS THE CUHP/SWMM MODEL 5-YEAR FLOWRATES WERE HIGHER IN COMPARISON. THE WELD COUNTY CALCULATIONS ARE INCLUDED IN THE APPENDIX OF THE DRAINAGE REPORT.

PEAK 100-YR POND OUTFLOWS DISCHARGING TO UNINCORPORATED WELD COUNTY SHALL BE AS FOLLOWS:

BASIN A - UNDEVELOPED 5-YR FLOWRATE = 2.0 CFS
BASIN D - UNDEVELOPED 5-YR FLOWRATE = 1.4 CFS
BASIN E - UNDEVELOPED 5-YR FLOWRATE = 6.0 CFS
BASIN F - UNDEVELOPED 5-YR FLOWRATE = 3.7 CFS

HISTORIC RUNOFF (CUHP/SWMM)

DE SIGN POINT	BASIN	DIRECT RUNOFF Q2 CFS	DIRECT RUNOFF Q5 CFS	DIRECT RUNOFF Q100 CFS	ROUTED RUNOFF Q2 CFS	ROUTED RUNOFF Q5 CFS	ROUTED RUNOFF Q100 CFS
1	A	0.4	4	57	-	-	-
2	OSB	0.1	2	22	-	-	-
3	B	0.6	7	91	0.8	8	113
4	C	0.6	7	88	-	-	-
5	D	0.3	4	47	-	-	-
6	E1	0.9	9	129	-	-	-
7	E2	0.8	8	117	1.6	17	246
8	F	0.7	7	111	-	-	-
9	E1+E2+F	-	-	-	1.9	24	355
10	OS1	0.9	10	140	1.8	27	485
11	OS2	0.6	7	93	1.8	31	571

DEVELOPED RUNOFF (CUHP/SWMM)

DE SIGN POINT	BASIN	DIRECT RUNOFF Q2 CFS	DIRECT RUNOFF Q5 CFS	DIRECT RUNOFF Q100 CFS	ROUTED RUNOFF Q2 CFS	ROUTED RUNOFF Q5 CFS	ROUTED RUNOFF Q100 CFS
1	A	17	27	106	-	-	-
2	OSB	5	9	39	-	-	-
3	B	27	42	170	32	51	209
4	C	38	56	190	-	-	-
5	D	19	29	96	-	-	-
6	E1	57	85	288	-	-	-
7	E2	52	77	264	108	162	551
8	F	33	53	216	-	-	-
9	Pond E + F Outflow	-	-	-	3	4	9
10	OS1	11	23	160	11	23	161
11	OS2	7	16	106	18	38	265

N

100 0 50 100 200
SCALE: 1"= 100 ' HORIZ.

KT ENGINEERING
ENGINEERS • SURVEYORS
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

DATE SUBMITTED: 10.31.2022

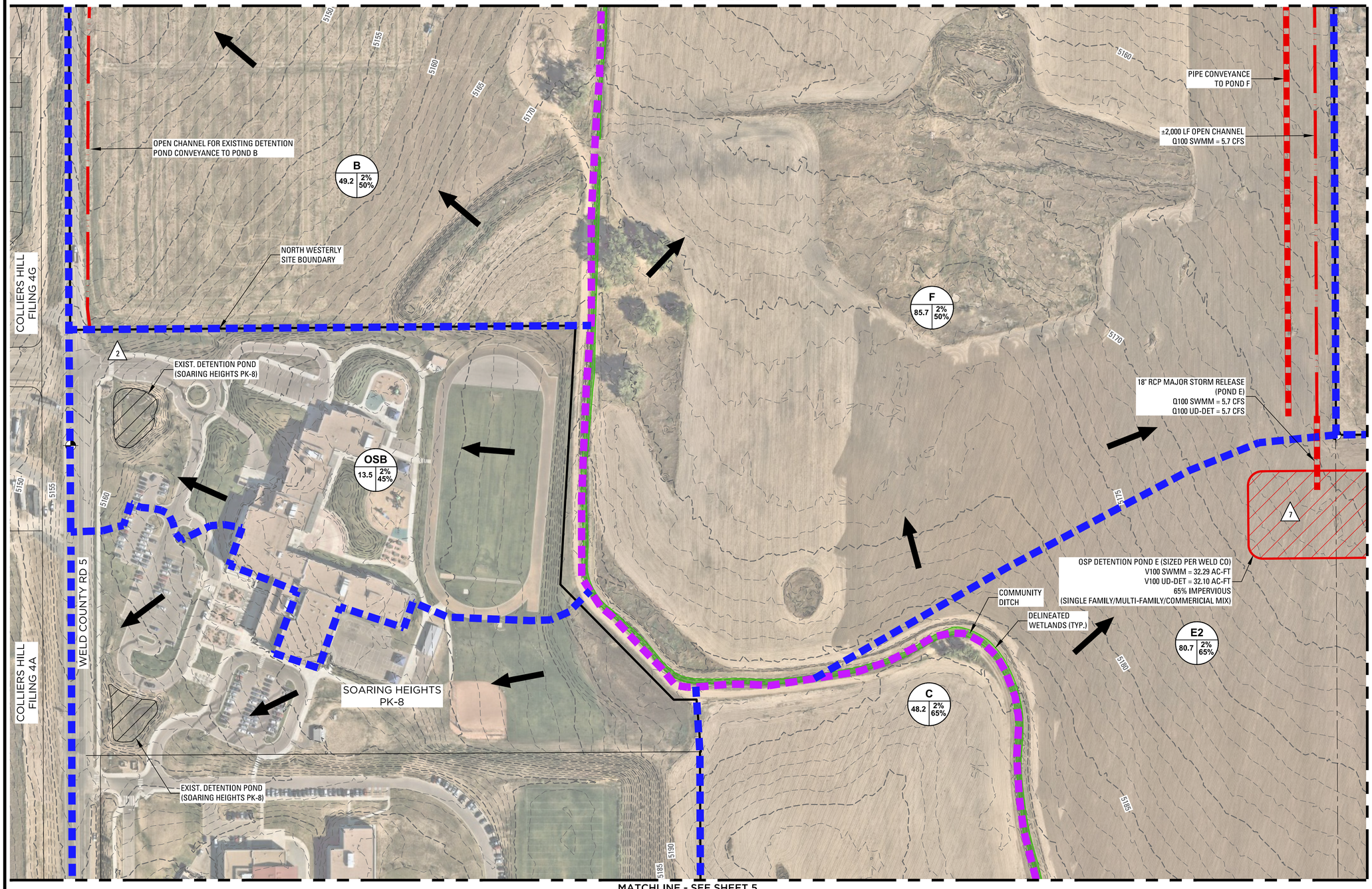
REVISION NO.	DATE
1	12.12.2023
2	06.21.2024
3	09.20.2024
4	01.30.2025
5	

PREPARED FOR:
SOUTHERN LAND CO.
3990 HILLSBORO PIKE, STE 400
NASHVILLE, TN 37215
615.778.3150

SCALE: 1" = 100' | JOB NO: 0043-1532 | BY: OKK

J:\0089221\ENGINEERING\DRAINAGE\PHASE I\CAD FILES\221E-P1-SWM-MAP-2KX36_2024-09-17.DWG

MATCHLINE - SEE SHEET 1



MATCHLINE - SEE SHEET 5

MATCHLINE - SEE SHEET 4

DRAINAGE MAP LEGEND

- DETENTION POND IMPROVEMENT
- OPEN CHANNEL IMPROVEMENT
- STORM PIPE IMPROVEMENT
- MAJOR DRAINAGE BASIN BOUNDARY
- MINOR DRAINAGE BASIN BOUNDARY
- EXISTING DETENTION POND
- DELINEATED WETLANDS
- DESIGN POINT
- SUB-BASIN I.D.
- HISTORIC CUHP % IMPERVIOUSNESS
- PROPOSED CUHP % IMPERVIOUSNESS
- SUB-BASIN AREA (ACRES)

WELD COUNTY POND SIZING CRITERIA FOR PONDS DISCHARGING TO UNINCORPORATED WELD COUNTY: MAXIMUM DEVELOPED 100-YR POND OUTFLOWS SHALL NOT EXCEED THE 5-YR HISTORIC (UNDEVELOPED) FLOWRATE. 5-YR HISTORIC FLOWRATES WERE DETERMINED USING WELD COUNTY CRITERIA AS THE CUHP/SWMM MODEL 5-YEAR FLOWRATES WERE HIGHER IN COMPARISON. THE WELD COUNTY CALCULATIONS ARE INCLUDED IN THE APPENDIX OF THE DRAINAGE REPORT.

PEAK 100-YR POND OUTFLOWS DISCHARGING TO UNINCORPORATED WELD COUNTY SHALL BE AS FOLLOWS:

BASIN A - UNDEVELOPED 5-YR FLOWRATE = 2.0 CFS
BASIN D - UNDEVELOPED 5-YR FLOWRATE = 1.4 CFS
BASIN E - UNDEVELOPED 5-YR FLOWRATE = 6.0 CFS
BASIN F - UNDEVELOPED 5-YR FLOWRATE = 3.7 CFS

HISTORIC RUNOFF (CUHP/SWMM)

DE SIGN POINT	BASIN	DIRECT RUNOFF			ROUTED RUNOFF		
		Q2	Q5	Q100	Q2	Q5	Q100
		CFS	CFS	CFS	CFS	CFS	CFS
1	A	0.4	4	57	-	-	-
2	OSB	0.1	2	22	-	-	-
3	B	0.6	7	91	0.8	8	113
4	C	0.6	7	88	-	-	-
5	D	0.3	4	47	-	-	-
6	E1	0.9	9	129	-	-	-
7	E2	0.8	8	117	1.6	17	246
8	F	0.7	7	111	-	-	-
9	E1+E2+F	-	-	-	1.9	24	355
10	OS1	0.9	10	140	1.8	27	485
11	OS2	0.6	7	93	1.8	31	571

DEVELOPED RUNOFF (CUHP/SWMM)

DE SIGN POINT	BASIN	DIRECT RUNOFF			ROUTED RUNOFF		
		Q2	Q5	Q100	Q2	Q5	Q100
		CFS	CFS	CFS	CFS	CFS	CFS
1	A	17	27	106	-	-	-
2	OSB	5	9	39	-	-	-
3	B	27	42	170	32	51	209
4	C	36	56	190	-	-	-
5	D	19	29	96	-	-	-
6	E1	57	85	288	-	-	-
7	E2	52	77	264	108	162	551
8	F	33	53	216	-	-	-
9	Pond E + F Outflow	-	-	-	3	4	9
10	OS1	11	23	160	11	23	161
11	OS2	7	16	106	18	38	265

N

100 0 50 100 200

SCALE: 1"= 100' HORIZ.

KT ENGINEERING
ENGINEERS • SURVEYORS
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

DATE SUBMITTED: 10.31.2022

REVISION NO.	DATE
1	12.12.2023
2	06.21.2024
3	09.20.2024
4	01.30.2025
5	

PREPARED FOR:
SOUTHERN LAND CO.
3990 HILLSBORO PIKE, STE 400
NASHVILLE, TN 37215
615.778.3150

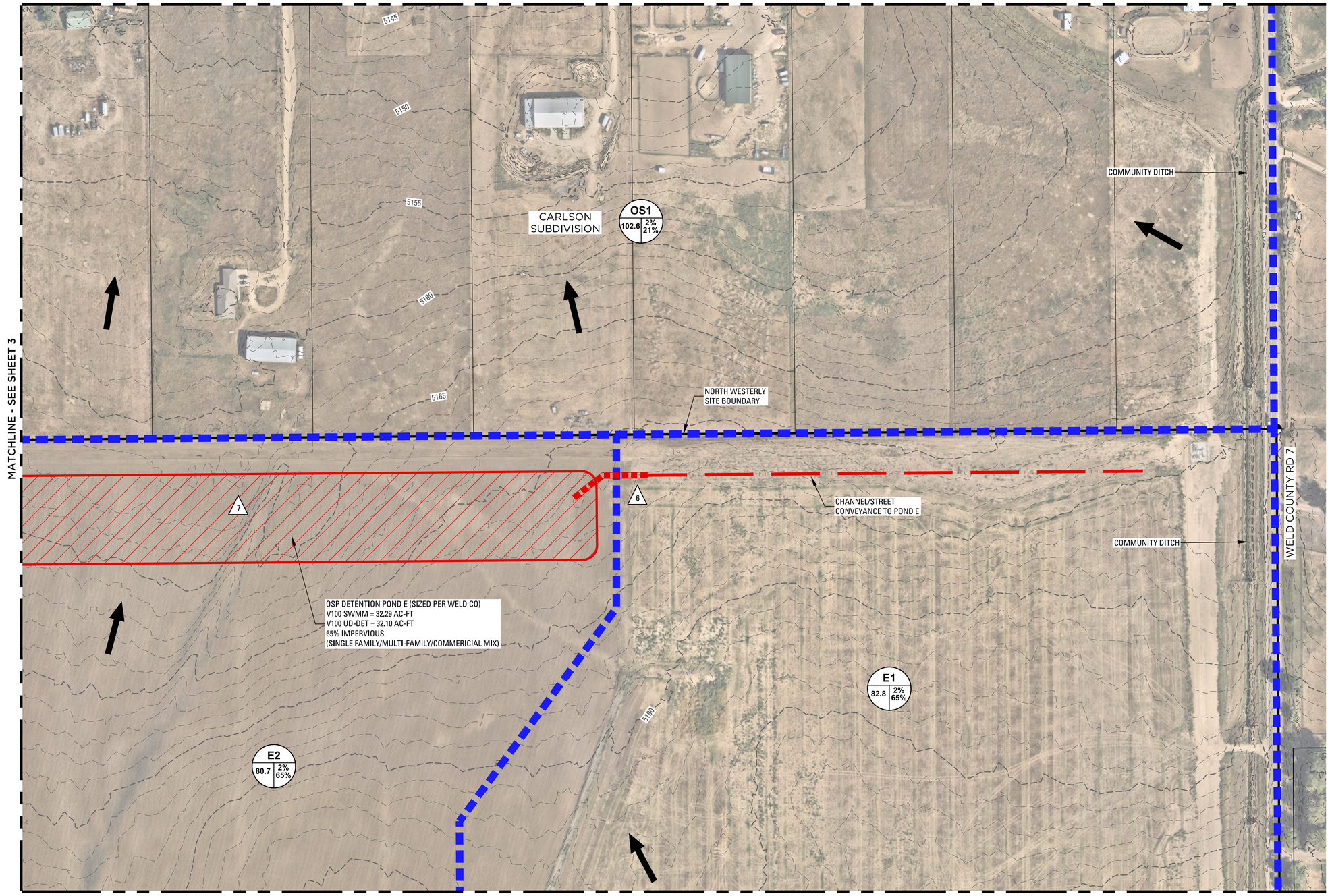
SCALE: 1" = 100' | JOB NO: 0043-1532 | BY: OKK

J:\0099\2216\CIVIL\DRAWG\EPHASE I\ROAD FILES\2216-P1-SHT-MAP-2400K_2024-08-17.DWG

MATCHLINE - SEE SHEET 2

MATCHLINE - SEE SHEET 3

MATCHLINE - SEE SHEET 6



DRAINAGE MAP LEGEND

- DETENTION POND IMPROVEMENT
- OPEN CHANNEL IMPROVEMENT
- STORM PIPE IMPROVEMENT
- MAJOR DRAINAGE BASIN BOUNDARY
- MINOR DRAINAGE BASIN BOUNDARY
- EXISTING DETENTION POND
- DELINEATED WETLANDS
- 1 — DESIGN POINT
- A — SUB-BASIN I.D.
- 2% — HISTORIC CUHP % IMPERVIOUSNESS
- 50% — PROPOSED CUHP % IMPERVIOUSNESS
- 30.5 — SUB-BASIN AREA (ACRES)

WELD COUNTY POND SIZING CRITERIA FOR PONDS DISCHARGING TO UNINCORPORATED WELD COUNTY:
MAXIMUM DEVELOPED 100-YR POND OUTFLOWS SHALL NOT EXCEED THE 5-YR HISTORIC (UNDEVELOPED) FLOWRATE. 5-YR HISTORIC FLOWRATES WERE DETERMINED USING WELD COUNTY CRITERIA AS THE CUHP/SWMM MODEL 5-YEAR FLOWRATES WERE HIGHER IN COMPARISON. THE WELD COUNTY CALCULATIONS ARE INCLUDED IN THE APPENDIX OF THE DRAINAGE REPORT.

PEAK 100-YR POND OUTFLOWS DISCHARGING TO UNINCORPORATED WELD COUNTY SHALL BE AS FOLLOWS:

BASIN A - UNDEVELOPED 5-YR FLOWRATE = 2.0 CFS
BASIN D - UNDEVELOPED 5-YR FLOWRATE = 1.4 CFS
BASIN E - UNDEVELOPED 5-YR FLOWRATE = 6.0 CFS
BASIN F - UNDEVELOPED 5-YR FLOWRATE = 3.7 CFS

HISTORIC RUNOFF (CUHP/SWMM)

DESIGN POINT	BASIN	DIRECT RUNOFF Q2 CFS	DIRECT RUNOFF Q5 CFS	DIRECT RUNOFF Q100 CFS	ROUTED RUNOFF Q2 CFS	ROUTED RUNOFF Q5 CFS	ROUTED RUNOFF Q100 CFS
1	A	0.4	4	57	-	-	-
2	OSB	0.1	2	22	-	-	-
3	B	0.6	7	91	0.8	8	113
4	C	0.6	7	88	-	-	-
5	D	0.3	4	47	-	-	-
6	E1	0.9	9	129	-	-	-
7	E2	0.8	8	117	1.6	17	246
8	F	0.7	7	111	-	-	-
9	E1+E2+F	-	-	-	1.9	24	355
10	OS1	0.9	10	140	1.8	27	485
11	OS2	0.6	7	93	1.8	31	571

DEVELOPED RUNOFF (CUHP/SWMM)

DESIGN POINT	BASIN	DIRECT RUNOFF Q2 CFS	DIRECT RUNOFF Q5 CFS	DIRECT RUNOFF Q100 CFS	ROUTED RUNOFF Q2 CFS	ROUTED RUNOFF Q5 CFS	ROUTED RUNOFF Q100 CFS
1	A	17	27	106	-	-	-
2	OSB	5	9	39	-	-	-
3	B	27	42	170	32	51	209
4	C	38	56	190	-	-	-
5	D	19	29	96	-	-	-
6	E1	57	85	288	-	-	-
7	E2	52	77	264	108	162	551
8	F	33	53	216	-	-	-
9	Pond E + F Outflow	-	-	-	3	4	9
10	OS1	11	23	160	11	23	161
11	OS2	7	16	106	18	38	265

N

100 0 50 100 200
SCALE: 1"= 100' HORIZ.

KT ENGINEERING
ENGINEERS • SURVEYORS
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

DATE SUBMITTED: 10.31.2022

REVISION NO.	DATE
1	12.12.2023
2	06.21.2024
3	09.20.2024
4	01.30.2025
5	

PREPARED FOR:
SOUTHERN LAND CO.
3990 HILLSBORO PIKE, STE 400
NASHVILLE, TN 37215
615.778.3150

SCALE:	JOB NO:	BY:
1" = 100'	0043-1532	OKK

J:\0099\2219\CIVIL\DRAINAGE\PHASE I\CAD FILES\2219-P1-DRN-MAP-2X36_2024-09-17.DWG

MATCHLINE - SEE SHEET 3

ERIE HIGH SCHOOL

COLLIERS PKWY

COLLIERS HILL FILING 4I

WELD COUNTY RD 5

DELINEATED WETLANDS (TYP.)

COMMUNITY DITCH

E2
80.7 | 2% | 65%

C
48.2 | 2% | 65%

EXTENDED DETENTION BASIN C
V100 SWMM = 7.18 AC-FT
V100 UD-DET = 6.91 AC-FT
65% IMPERVIOUS
(SINGLE FAMILY/MULTI-FAMILY/COMMERCIAL MIX)

EXIST. DETENTION POND
(ERIE HIGH SCHOOL)

36" RCP MAJOR STORM RELEASE
Q100 SWMM = 30.7 CFS
Q100 UD-DET = 30.3 CFS

POND CONVEYANCE TO EXIST. STORM DRAIN SYSTEM (EXIST. 36" RCP)

EXIST. 36" RCP @ 0.65%
Q100 PER 2014 MODIFICATION DRAINAGE LETTER/REPORT BY CREATIVE CIVIL SOLUTIONS = 32 CFS

ERIE PARKWAY
(WELD COUNTY RD 8)

WESTERLY SUBDIVISION

MATCHLINE - SEE SHEET 6

DRAINAGE MAP LEGEND

- DETENTION POND IMPROVEMENT
- OPEN CHANNEL IMPROVEMENT
- STORM PIPE IMPROVEMENT
- MAJOR DRAINAGE BASIN BOUNDARY
- MINOR DRAINAGE BASIN BOUNDARY
- EXISTING DETENTION POND
- DELINEATED WETLANDS
- DESIGN POINT
- SUB-BASIN I.D.
- HISTORIC CUHP % IMPERVIOUSNESS
- PROPOSED CUHP % IMPERVIOUSNESS
- SUB-BASIN AREA (ACRES)

(A: 30.5 | 2% | 50%)

WELD COUNTY POND SIZING CRITERIA FOR PONDS DISCHARGING TO UNINCORPORATED WELD COUNTY:
MAXIMUM DEVELOPED 100-YR POND OUTFLOWS SHALL NOT EXCEED THE 5-YR HISTORIC (UNDEVELOPED) FLOWRATE. 5-YR HISTORIC FLOWRATES WERE DETERMINED USING WELD COUNTY CRITERIA AS THE CUHP/SWMM MODEL 5-YEAR FLOWRATES WERE HIGHER IN COMPARISON. THE WELD COUNTY CALCULATIONS ARE INCLUDED IN THE APPENDIX OF THE DRAINAGE REPORT.

PEAK 100-YR POND OUTFLOWS DISCHARGING TO UNINCORPORATED WELD COUNTY SHALL BE AS FOLLOWS:

BASIN A - UNDEVELOPED 5-YR FLOWRATE = 2.0 CFS
BASIN D - UNDEVELOPED 5-YR FLOWRATE = 1.4 CFS
BASIN E - UNDEVELOPED 5-YR FLOWRATE = 6.0 CFS
BASIN F - UNDEVELOPED 5-YR FLOWRATE = 3.7 CFS

HISTORIC RUNOFF (CUHP/SWMM)

DESIGN POINT	BASIN	DIRECT RUNOFF Q2 CFS	DIRECT RUNOFF Q5 CFS	DIRECT RUNOFF Q100 CFS	ROUTED RUNOFF Q2 CFS	ROUTED RUNOFF Q5 CFS	ROUTED RUNOFF Q100 CFS
1	A	0.4	4	57	-	-	-
2	OSB	0.1	2	22	-	-	-
3	B	0.6	7	91	0.8	8	113
4	C	0.6	7	88	-	-	-
5	D	0.3	4	47	-	-	-
6	E1	0.9	9	129	-	-	-
7	E2	0.8	8	117	1.6	17	246
8	F	0.7	7	111	-	-	-
9	E1+E2+F	-	-	-	1.9	24	355
10	OS1	0.9	10	140	1.8	27	485
11	OS2	0.6	7	93	1.8	31	571

DEVELOPED RUNOFF (CUHP/SWMM)

DESIGN POINT	BASIN	DIRECT RUNOFF Q2 CFS	DIRECT RUNOFF Q5 CFS	DIRECT RUNOFF Q100 CFS	ROUTED RUNOFF Q2 CFS	ROUTED RUNOFF Q5 CFS	ROUTED RUNOFF Q100 CFS
1	A	17	27	106	-	-	-
2	OSB	5	9	39	-	-	-
3	B	27	42	170	32	51	209
4	C	38	56	190	-	-	-
5	D	19	29	96	-	-	-
6	E1	57	85	288	-	-	-
7	E2	52	77	264	108	162	551
8	F	33	53	216	-	-	-
9	Pond E + F Outflow	-	-	-	3	4	9
10	OS1	11	23	160	11	23	161
11	OS2	7	16	106	18	38	265

N

100 0 50 100 200
SCALE: 1"= 100' HORIZ.

KT ENGINEERING
ENGINEERS • SURVEYORS
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

DATE SUBMITTED: 10.31.2022

REVISION NO.	DATE
1	12.12.2023
2	06.21.2024
3	09.20.2024
4	01.30.2025
5	

PREPARED FOR:
SOUTHERN LAND CO.
3990 HILLSBORO PIKE, STE 400
NASHVILLE, TN 37215
615.778.3150

SCALE:	JOB NO:	BY:
1" = 100'	0043-1532	OKK

J:\0099\231\6\CIVIL\DRAINAGE\PHASE I\CAD FILES\231X-P1-DRK-MAP-2400K_2024-09-17.DWG

MATCHLINE - SEE SHEET 4

MATCHLINE - SEE SHEET 5

E2
80.7 | 2% 65%

82.8 | 2% 65%

D
22.4 | 2% 65%

5

5185
5190
5200
5205
5210

COMMUNITY DITCH

18" RCP MAJOR STORM RELEASE
Q100 SWMM = 1.3 CFS
Q100 UD-DET = 1.3 CFS

DELINEATED NON-JURISDICTIONAL WETLANDS (TYP.)

COMMUNITY DITCH FLOW SPLITTER

DELINEATED NON-JURISDICTIONAL WETLANDS (TYP.)

ERIE PARKWAY
(WELD COUNTY RD 8)

COMMUNITY

N

100 0 50 100 200
SCALE: 1"= 100 ' HORIZ.

J:\8099\2216\CIVIL\DRAINAGE\PHASE I\CAD FILES\2216-P1-DRN-MAP_2024-09-13.DWG

KT ENGINEERING
ENGINEERS • SURVEYORS
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

DATE SUBMITTED:
10.31.2022

REVISION NO.	DATE
1	12.12.2023
2	06.21.2024
3	09.20.2024
4	03.24.2025
5	

PREPARED FOR:
SOUTHERN LAND CO.
3990 HILLSBORO PIKE, STE 400
NASHVILLE, TN 37215
615.778.3150

SCALE:	JOB NO:	BY:
1" = 100'	0043-1532	OKK

SHEET 6 OF 6

LSC TRANSPORTATION CONSULTANTS, INC.

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

April 18, 2025

Mr. Ken Toland
KT Engineering
12500 W. 58th Avenue, Suite 230
Arvada, CO 80002

Re: North Westerly
Erie, CO
LSC #221032

Dear Mr. Toland:

Per your request, we have completed this updated traffic impact analysis for the proposed North Westerly mixed-use development in Erie, Colorado, to address Town comments. The site is located north of Erie Parkway, east of Weld County Road (WCR) 5, and west of Weld County Road (WCR) 7 as shown in Figure 1.

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; the projected short-term and long-term background and resulting total traffic volumes on the area roadways; the site's projected traffic impacts; and any recommended roadway improvements to mitigate the site's traffic impacts or the impacts from growth in background traffic.

LAND USE AND ACCESS

Figure 2a shows the proposed site plan. The site is proposed to include about 768 single-family detached dwelling units, about 700 single-family attached dwelling units, about 250 multi-family dwelling units, a mix of 428 age-restricted dwelling units, and up to 150,000 square feet of retail/commercial space. Access is proposed to County Road 5, County Road 7, County Road 10, and Erie Parkway as shown on Figure 2b. Figure 2b also shows the proposed classification of the internal roadways.

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 principal arterial roadway south of the site. The intersections with WCR 5 and WCR 7 are signalized with auxiliary turn lanes. The posted speed limit in the vicinity of the site is 50 mph. The *Town of Erie Master Transportation Plan* shows Erie Parkway as a four-lane principal arterial at buildout.

- **Weld County Road 5** is a north-south, two-lane minor arterial roadway west of the site. The intersection with Erie Parkway is signalized with auxiliary turn lanes. The posted speed limit is 35 mph from Erie Parkway to WCR 10 and 45 mph north of WCR 10. There is a posted 25 mph school zone adjacent to Erie High School and Soaring Heights PK-8. The 2024 *Town of Erie Transportation Mobility Plan* (TMP) shows a four-lane minor arterial at buildout.

- **Weld County Road 7** is a north-south, two-lane principal arterial roadway east of the site. The intersection with Erie Parkway was recently signalized. The posted speed limit in the vicinity of the site is 45 mph. The TMP shows a four-lane principal arterial at buildout.

- **Weld County Road 10** is an east-west, two-lane minor arterial roadway north of the site. The intersections with WCR 5 and WCR 10 are stop-sign controlled. The posted speed limit is 35 mph. The TMP shows a two-lane minor arterial at buildout.

Existing Traffic Conditions

Figures 3a and 3b show the existing 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 October, 2024 and February, 2025. Figures 3c and 3d show the existing lane geometries, traffic controls, and posted speed limits in the vicinity of the site.

Background Traffic

Figures 4a and 4b show the estimated buildout year (2035) background traffic volumes. Figures 4c and 4d show the projected 2035 background lane geometry and traffic control. The volumes shown in Figures 4a and 4b were developed based on the existing traffic volumes shown in Figure 3a plus increases in through traffic due to regional growth assuming an annual growth rate of about one percent plus traffic projected to be generated by buildout of other area developments including Summerfield, Colliers Hills, the residential portion of Erie Highlands and Westerly. The background traffic volumes from the area developments were estimated by LSC based on traffic studies for those developments and a small area traffic model developed by LSC to determine the projected traffic volumes for lots and parcels within those developments that are currently undeveloped. Key pages from the area traffic studies are attached for reference.

Figures 5a and 5b show the estimated 2045 background traffic volumes. Figures 5c and 5d show the projected 2035 background lane geometry and traffic control. The volumes shown in Figures 5a and 5b were developed based on the existing traffic volumes shown in Figures 3a and 3b plus increases in through traffic due to regional growth assuming an annual growth rate of about one percent plus traffic projected to be generated by buildout of other area developments including Summerfield, Colliers Hills, Erie Highlands, Westerly, North Station and Erie Gateway. The 2045 background volumes also assume Flora View Drive has been constructed through the North Westerly parcel as shown in Figure 4 Future Street Classifications of the

Transportation Mobility Plan. The combination of the various background traffic volumes results in an increase of traffic on WCR 5 south of WCR 10 from 3,980 vehicles per day (vpd) to 11,580 vpd over 20 years which would be equivalent to a 5.5 percent annual growth rate. The traffic on Erie Parkway west of WCR 7 is estimated to increase from 13,545 vph to 32,105 vph which would be equivalent to a 4.4 percent annual growth rate. The traffic volumes shown in Figures 5a and 5b plus site-generated traffic are greater than the 2050 traffic projections in the TMP.

Existing, 2035 Background, and 2045 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 3a through 5d were analyzed as appropriate to determine the existing and projected 2035 and 2045 background levels of service using Synchro Version 11 which utilizes the *Highway Capacity Manual*, 6th Edition methodology. Table 1 shows the level of service results. The level of service reports are attached.

1. **CR 5/CR 10:** All movements at this unsignalized intersection currently operate at LOS "D" or better during both morning and afternoon peak-hours. By 2035, this intersection is expected to be reconstructed as a modern one-lane roundabout. It is expected to operate at an overall LOS "C" or better during the morning and afternoon peak-hours through 2045.

2. **CR 10/Three-Quarter Movement Site Access:** This intersection was analyzed only in the 2035 and 2045 total traffic scenarios.

3. **CR 10/Major North-South Collector:** This intersection was analyzed only in the 2035 and 2045 total traffic scenarios.

4. **CR 7/CR 10:** All movements at this unsignalized intersection currently operate at LOS "C" or better during both morning and afternoon peak-hours. By 2035 the westbound and eastbound approaches are projected to operate at LOS "D" during the afternoon peak-hour. By 2045, this intersection is expected to be improved to provide two northbound and southbound through lanes plus left- and right-turn lanes and be converted to traffic signal control. As a signalized intersection it is expected to operate at an overall LOS "C" during both morning and afternoon peak-hours.

5. **Erie Parkway/CR 5:** This traffic signal controlled intersection currently operates at LOS "C" during both morning and afternoon peak-hours. By 2035 it is expected to operate at LOS "F" during both morning and afternoon peak-hours if no improvements are made. By 2045, this intersection is expected to be improved to provide two through lanes in all directions. Based on the 2045 background volumes shown in Figure 5a and the lane geometry shown in Figure 5c it is expected to operate at an overall LOS "D" during the morning peak-hour and LOS "C" during the afternoon peak-hour. Some of the minor movements are expected to operate at LOS "E" or LOS "F". These movements have projected delays in the LOS "E" or LOS "F" range simply because they arrive at the traffic signal at the begin-

ning of the red phase at an intersection with many phases and a long cycle length. These movements would not be considered "failing" since their volume-to-capacity ratios are less than one. The justification is that to progress through traffic along an arterial corridor, the traffic signal offsets and left-turn phase times have been adjusted to favor the through band, which can result in higher delay for the left-turn movements even though there is sufficient capacity for them.

6. **Erie Parkway/Westerly Boulevard:** This stop-sign controlled intersection is planned to be restricted to three-quarter movement (left-in/right-in/right-out only). All movements currently operate at LOS "C" or better during the peak-hours. By 2035 the northbound right-turn movement is expected to operate at LOS "E" during the morning peak-hour and LOS "F" during the afternoon peak-hour if Erie Parkway is unimproved. By 2045 this intersection is expected to be improved to provide two eastbound and westbound through lanes. Based on the 2045 background volumes shown in Figure 5a and the lane geometry shown in Figure 5c all movements at this intersection are expected to continue to operate at LOS "C" or better during the peak-hours.

7. **Erie Parkway/Waterford Street:** All movements at this stop-sign controlled intersection currently operate at LOS "C" or better during the peak-hours. By 2035 it was assumed that the Westerly development south of Erie Parkway would be built out and that this intersection will be converted to traffic signal control. As a signal control it is expected to operate at an overall LOS "C" during the morning peak-hour and LOS "D" during the afternoon peak-hour, however, the eastbound through movement is expected to operate at LOS "F" if Erie Parkway remains a two-lane roadway through 2035. By 2045, this intersection is expected to be improved to provide two eastbound and westbound through lanes. Based on the 2045 background volumes shown in Figure 5a and the lane geometry shown in Figure 5c it is expected to operate at an overall LOS "B" and all movements are projected to operate at LOS "D" or better during the peak-hours.

8. **Erie Parkway/Future Access:** This future traffic signal controlled intersection is not expected to be constructed by 2035 without the proposed development. It is expected to operate at an overall LOS "B" or better during the peak-hours based on the 2045 background volumes shown in Figure 5a and the lane geometry shown in Figure 5c.

9. **Erie Parkway/CR 7:** This traffic signal controlled intersection currently operates at LOS "C" during both morning and afternoon peak-hours. By 2035 it is expected to operate at LOS "F" during both morning and afternoon peak-hours if no improvements are made. By 2045, this intersection is expected to be improved to provide two through lanes in all directions. Based on the 2045 background volumes shown in Figure 5a and the lane geometry shown in Figure 5c it is expected to continue to operate at an overall LOS "C" during the peak-hours.

10. **CR 5/Three-Quarter Movement Site Access:** This intersection was analyzed only in the 2035 and 2045 total traffic scenarios.

11. **CR 5/Flora View Drive:** This signal controlled intersection currently operates at LOS "C" during the morning peak-hour and LOS "B" during the afternoon peak-hour and is expected to do so through 2035. It is expected to operate at an overall LOS "C" during both peak-hours based on the projected 2045 background traffic volumes.

12. **CR 7/CR 8.75:** All movements at this unsignalized intersection currently operate at LOS "B" or better during both morning and afternoon peak-hours and are expected to continue to do so through 2035. By 2045, this intersection is expected to be improved to provide two northbound and southbound through lanes plus a northbound left-turn lane. Based on the 2045 background volumes shown in Figure 4a and the lane geometry shown in Figure 4b all movements are expected to continue to operate at an overall LOS "B" or better during the peak-hours.

13. **CR 7/Flora View Drive:** The east leg of this future signal controlled intersection is anticipated to be constructed as part of the future Erie Gateway development. This TIS assumes the Erie Gateway parcel is undeveloped by 2035 and fully built out by 2045. The 2045 background traffic volumes shown in Figure 5a also assume Flora View Drive has been constructed through the North Westerly parcel as shown in the MTP after 2035 but before 2045. As a traffic signal controlled intersection it is expected to operate at an overall LOS "C" during the peak-hours based on the 2045 background volumes shown in Figure 5a and the lane geometry shown in Figure 5c.

14. Access is no longer proposed at this location.

15. **CR 7/North Three-Quarter-Movement Site Access:** This intersection was analyzed only in the 2035 and 2045 total traffic scenarios.

16. **CR 7/South Three-Quarter-Movement Site Access:** This intersection was analyzed only in the 2035 and 2045 total traffic scenarios.

17. Access is no longer proposed at this location

18. **Flora View Drive/Major North-South Collector:** This intersection was analyzed only in the 2035 and 2045 total traffic scenarios.

19. **Flora View Drive/Minor North-South Collector:** This intersection was analyzed only in the 2035 and 2045 total traffic scenarios.

20. **CR 5/North High School Access:** All movements at this stop-sign controlled intersection currently operate at LOS "B" or better during the peak-hours. The westbound approach is expected to operate at LOS "C" during the afternoon peak-hour by 2035 and LOS "D" during the afternoon peak-hour by 2045.

21. **CR 5/Colliers Parkway/High School Access:** This existing signal controlled intersection currently operates at an overall LOS "C" during the morning peak-hour and LOS "B" during the afternoon peak-hour and is expected to do so through 2045.

22. **CR 5/South High School Access:** All movements at this stop-sign controlled intersection currently operates at LOS "C" or better during the peak-hours. The westbound approach is expected to operate at LOS "E" during the afternoon peak-hour by 2035 and LOS "F" during the afternoon peak-hour by 2045. The west leg of this intersection is currently restricted to right-in/right-out only. To maintain an acceptable level of service it may be

necessary to further restrict the east leg to three-quarter movement (left-in/right-in/right-out only) with a raised median.

23. **Major North-South Collector/East-West Local:** This intersection was analyzed only in the 2035 and 2045 total traffic scenarios.

24. **Minor North-South Collector/East-West Local:** This intersection was analyzed only in the 2035 and 2045 total traffic scenarios.

TRIP GENERATION

Table 2a 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*, 11th Edition, 2021 by the Institute of Transportation Engineers (ITE) for the proposed land use.

The site is projected to generate about 25,686 vehicle-trips on the average weekday, with about half entering and half exiting the site 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 435 vehicles would enter and about 892 vehicles would exit the site. During the afternoon peak-hour, which generally occurs for one hour between 4:00 and 6:30 p.m., about 1,220 vehicles would enter and about 923 vehicles would exit the site. These estimates are expected to be reduced due to internal and passby trips as shown in Table 2b.

DIRECTIONAL DISTRIBUTION

Figure 6 shows the estimated directional distribution of site-generated traffic. 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 and access plan.

TRIP ASSIGNMENT

Figures 7a and 7b show the estimated buildout site-generated traffic volumes based on the directional distribution percentages (from Figure 6) and the trip generation estimate (from Table 2a).

TOTAL TRAFFIC

Figures 8a and 8b show the 2035 total traffic which is the sum of the 2035 background traffic volumes (from Figures 4a and 4b) and the site-generated traffic volumes (from Figures 7a and 7b). Figures 8c and 8d show the recommended 2035 lane geometry and traffic control.

Figures 9a and 9b show the 2045 total traffic which is the sum of the 2045 background traffic volumes (from Figures 5a and 5b) and the site-generated traffic volumes (from Figures 7a and 7b). Figures 9c and 9d show the recommended 2045 lane geometry and traffic control.

TRAFFIC SIGNAL WARRANT ANALYSIS

Key study area intersections were analyzed to determine if the projected morning and afternoon peak-hour volumes would meet the thresholds criteria for Eight-Hour and/or Four-Hour Vehi-

cular Volume Traffic Signal Warrants in the 2023 *Manual on Uniform Traffic Control Devices*, 11th Edition (MTCD). The signal warrant analysis was based on the 2035 and 2045 background and total traffic peak-hour traffic volumes. Off-peak-hour volumes were estimated by LSC based on the peak-hour volume and on 24-hour counts conducted by LSC on CR 5, CR 7, CR 10, and Erie Parkway in the vicinity of the site in November, 2024.

Tables 3a through 6b show the projected peak-hour traffic volumes compared to the traffic volume thresholds for the following intersections:

- CR 7/CR 10 (#4)
  - Table 3a: 2035 Analysis
  - Table 3b: 2045 Analysis
- Erie Parkway/Waterford Street/Major North-South Collector (#7)
  - Table 4: 2035 Analysis
- Erie Parkway/Future Access/Minor North South Collector (#8)
  - Table 5: 2035 Analysis
- CR 7/Flora View Drive (#13)
  - Table 6a: 2035 Analysis
  - Table 6b: 2045 Analysis

The findings of Tables 3a through 6b are summarized in Table 7. Based on the analysis the intersections of Erie Parkway/Waterford Street/Major North-South Collector (#7) and Erie Parkway/Future Access/Minor North South Collector (#8) could potentially meet one or more vehicular volume traffic signal warrants by 2035 assuming full buildout of the North Westerly development. The intersections of CR 7/CR 10 (#4) and CR 7/Flora View Drive (#13) could potentially meet one or more vehicular volume traffic signal warrants by 2045.

PROJECTED LEVELS OF SERVICE

The intersections in Figures 8a, 8b, 9a, and 9b were analyzed to determine the 2035 and 2045 total levels of service based on the lane geometry and traffic control shown in Figures 8c, 8d, 9c, and 9d. Table 1 shows the level of service analysis results. The level of service reports are attached.

All movements at the study area intersections are expected to operate at LOS "D" or better during the peak-hours based on the projected 2045 total traffic volumes shown in Figures 9a and 9b and the recommended lane geometry and traffic control shown in Figures 9c and 9d except for the eastbound, westbound, and northbound left-turn movements at the intersection of Erie Parkway/CR 5 (#5) which are projected to operate at LOS "E" during the morning peak-hour, the southbound right-turn movement at the southbound right-turn at the intersection of CR 5/Erie Parkway (#5) which are expected to operate at LOS "F" during the morning peak-hour, the left-turn movements at the intersection of Erie Parkway/Minor North-South Collector/Future Access (#8) which are expected to operate at LOS "E" during the afternoon peak-hour, the left-turn movements at the intersection of Erie Parkway/CR 7 (9) which are expected to operate at LOS "E" during the afternoon peak-hour, the westbound approach at the north high school access to CR 7 (#20) which is expected to operate at LOS "E" during the afternoon peak-hour, the westbound approach at the south high school access to CR 7 (#20) which is expected to operate at LOS "F" during the afternoon peak-hour.

1. **CR 5/CR 10:** By 2035, this intersection is expected to reconstructed as a modern one-lane roundabout. It is expected to operate at an overall LOS "D" or better during the morning and afternoon peak-hours through 2045.

2. **CR 10/Three-Quarter Movement Site Access:** All movements at this future three-quarter movement access (left-in/right-in/right-out only) are expected to operate at LOS "B" or better during the peak-hours through 2045.

3. **CR 10/Major North-South Collector:** All movements at this future stop-sign controlled intersection are expected to operate at LOS "B" or better during the peak-hours through 2045.

4. **CR 7/CR 10:** Based on the 2035 total traffic volumes shown in Figure 8a and the recommended 2035 lane geometry shown in Figure 8c all movements at this stop-sign controlled intersection are expected to operate at LOS "D" or better during the peak-hours except for the westbound left-turn movement which is expected to operate at LOS "F" and the eastbound left-turn movement which is expected to operate at LOS "E" during the afternoon peak-hour. This intersection is planned to be signal controlled in the future but traffic signal warrants are not anticipated to be met in the short-term. It is not uncommon for the minor movements at stop-sign controlled intersections to operate at LOS "E" or LOS "F" as the volumes approach the thresholds for a signal warrant. By 2045, this intersection is expected to be improved to provide two northbound and southbound through lanes plus left- and right-turn lanes and be converted to traffic signal control. Based on the 2045 total volumes shown in Figure 9a and the lane geometry shown in Figure 9c it is expected to operate at an overall LOS "C" during both morning and afternoon peak-hours.

5. **Erie Parkway/CR 5:** As part of a pre-development agreement the North Westerly development will be required to construct the north half of Erie Parkway including medians in a single phase and concurrently with the North Westerly development. Based on the 2035 total traffic volumes shown in Figure 8a and the 2035 total lane geometry shown in Figure 8c and the 2045 total traffic volumes shown in Figure 9a and the 2045 total lane geometry shown in Figure 9c this intersection is expected to operate at an overall LOS "D" during the peak-hours through 2045. Some of the minor movements are expected to operate at LOS "E" or LOS "F". These movements have projected delays in the LOS "E" or LOS "F" range simply because they arrive at the traffic signal at the beginning of the red phase at an intersection with many phases and a long cycle length. These movements would not be considered "failing" since their volume-to-capacity ratios are less than one. The justification is that to progress through traffic along an arterial corridor, the traffic signal offsets and left-turn phase times have been adjusted to favor the through band, which can result in higher delay for the left-turn movements even though there is sufficient capacity for them.

6. **Erie Parkway/Westerly Boulevard/North Westerly Right-In/Right-Out:** This stop-sign controlled intersection is planned to be restricted to three-quarter movement (left-in/right-in/right-out only) for the south leg and right-in/right-out only for the north leg. As part of a pre-development agreement the North Westerly development will be required to construct the north half of Erie Parkway including medians in a single phase and concurrently with the Westerly development. Based on the 2035 total volumes shown in Figure 8a and the lane geometry shown in Figure 8c all movements at this intersection are expected

to continue to operate at LOS "C" or better during the peak-hours. By 2045 the northbound right-turn and westbound left-turn movements are expected to operate at LOS "D" during the afternoon peak-hour.

7. **Erie Parkway/Waterford Street/Major North-South Collector:** As part of a pre-development agreement the North Westerly development will be required to construct the north half of Erie Parkway including medians in a single phase and concurrently with the North Westerly development. Based on the 2035 total volumes shown in Figure 8a and the lane geometry shown in Figure 8c this intersection is expected to operate at an overall LOS "C" during the peak-hours and is expected to operate at LOS "D" or better through 2045.

8. **Erie Parkway/Minor North-South Collector/Future Access:** As part of a pre-development agreement the North Westerly development will be required to construct the north half of Erie Parkway including medians in a single phase and concurrently with the North Westerly development. This future traffic signal controlled intersection is expected to operate at an overall LOS "B" or better during the peak-hours based on the 2035 total volumes shown in Figure 8a and the lane geometry shown in Figure 8c. By 2045 it was assumed that a south leg would be constructed at this intersection. Based on the 2045 total traffic volumes shown in Figure 9a and the 2045 total lane geometry shown in Figure 9c this intersection is expected to operate at an overall LOS "D" during the afternoon peak-hour. Some of the minor movements are expected to operate at LOS "E". These movements have projected delays in the LOS "E" range simply because they arrive at the traffic signal at the beginning of the red phase at an intersection with many phases and a long cycle length. These movements would not be considered "failing" since their volume-to-capacity ratios are less than one. The justification is that to progress through traffic along an arterial corridor, the traffic signal offsets and left-turn phase times have been adjusted to favor the through band, which can result in higher delay for the left-turn movements even though there is sufficient capacity for them.

9. **Erie Parkway/CR 7:** As part of a pre-development agreement the North Westerly development will be required to construct the north half of Erie Parkway including medians in a single phase and concurrently with the North Westerly development. Based on the 2035 total volumes shown in Figure 8a and the lane geometry shown in Figure 8c it is expected to operate at an overall LOS "D" or better during the peak-hours and is expected to do so through 2045. Some of the minor movements are expected to operate at LOS "E". These movements have projected delays in the LOS "E" range simply because they arrive at the traffic signal at the beginning of the red phase at an intersection with many phases and a long cycle length. These movements would not be considered "failing" since their volume-to-capacity ratios are less than one. The justification is that to progress through traffic along an arterial corridor, the traffic signal offsets and left-turn phase times have been adjusted to favor the through band, which can result in higher delay for the left-turn movements even though there is sufficient capacity for them.

10. **CR 5/Three-Quarter Movement Site Access:** This future stop-sign controlled intersection is planned to be restricted to three-quarter movement (left-in/right-in/right-out only). Based on the 2035 total volumes shown in Figure 8a and the lane geometry shown in Figure 8c all movements at this intersection are expected to operate at LOS "B" or better during the peak-hours and is expected to continue to do so through 2045.

11. **CR 5/Flora View Drive:** Based on the 2035 total traffic volumes shown in Figure 8a and the 2035 total lane geometry shown in Figure 8c this currently traffic signal controlled intersection is expected to operate at an overall LOS "C" or better during the peak-hours and are expected to do so through 2045.

12. **CR 7/CR 8.75:** All approaches at this stop-sign controlled intersection are expected to operate at LOS "B" or better during the peak-hours based on the 2035 total traffic volumes shown in Figure 8a and the 2035 lane geometry shown in Figure 8c. By 2045, this stop-sign controlled intersection is expected to be improved to provide two northbound and southbound through lanes plus a northbound left-turn lane. Based on the 2045 total volumes shown in Figure 9a and the lane geometry shown in Figure 9c all movements are expected to operate at LOS "B" or better during the peak-hours.

13. **CR 7/Flora View Drive:** This intersection is planned to initially be constructed as a stop-sign controlled "T" intersection. Based on the 2035 total traffic volumes shown in Figure 8a and the 2035 lane geometry shown in Figure 8c all movements are expected to operate at LOS "D" or better during the peak-hours. By 2045 it was assumed that an east leg would be constructed as part of the future Erie Gateway development and that this intersection would be converted to traffic signal control. As a traffic signal controlled intersection is expected to operate at an overall LOS "C" during the peak-hours based on the 2045 total volumes shown in Figure 9a and the lane geometry shown in Figure 9c.

14. Access is no longer proposed at this location.

15. **CR 7/North Three-Quarter Movement Site Access:** All movements at this future stop-sign controlled intersection are expected to operate at LOS "B" or better during the peak-hours through 2045.

16. **CR 7/South Three-Quarter Movement Site Access:** All movements at this future stop-sign controlled intersection are expected to operate at LOS "B" or better during the peak-hours through 2045.

17. Access is no longer proposed at this location.

18. **Flora View Drive/Major North-South Collector:** All approaches at this future one-lane modern roundabout are expected to operate at an overall LOS "A" during the peak-hours through 2045.

19. **Flora View Drive/Minor North-South Collector:** All movements at this intersection are expected to operate at an overall LOS "B" or better during the peak-hours through 2045 if it is stop-sign controlled. This intersection could also potentially be constructed as a modern one-lane roundabout.

20. **CR 5/North High School Access:** All movements at this stop-sign controlled intersection currently operate at LOS "B" or better during the peak-hours. By 2035 the westbound approach is expected to operate at LOS "C" during the afternoon peak-hour and is expected to operate at LOS "E" by 2045.

21. **CR 5/Colliers Parkway/High School Access:** This existing signal controlled intersection currently operates at an overall LOS "C" during the morning peak-hour and LOS "B" during the afternoon peak-hour and is expected to do so through 2045.

22. **CR 5/South High School Access:** All movements at this stop-sign controlled intersection currently operate at LOS "C" or better during the peak-hours. The westbound approach is expected to operate at LOS "F" during afternoon peak-hour by 2035. The west leg of this intersection is currently restricted to right-in/right-out only. To maintain an acceptable level of service it may be necessary to further restrict the east leg to three-quarter movement (left-in/right-in/right-out only) with a raised median.

23. **Major North-South Collector/East-West Local:** All movements at this future stop-sign controlled intersection are expected to operate at LOS "B" or better during the peak hours through 2045.

24. **Minor North-South Collector/East-West Local:** All approached at this future all-way, stop-sign controlled intersection are expected to operate at LOS "B" or better during the peak hours through 2045.

95TH PERCENTILE QUEUE LENGTHS AND RECOMMENDED TURN LANES

The estimated 2045 95th percentile queue lengths for the intersections in the study area are shown in Table 8. Table 8 also shows the recommended turn lane lengths based on the auxiliary lane criteria contained in the Town of Erie *Standard & Specifications* section 521.03.09 , the projected turning volumes, and the projected 95th percentile queue lengths. The recommended turn lane lengths are all greater than the 95th percentile queue lengths except for Intersection #21 (CR 5/Colliers Parkway/High School Access). The available turn lane length at this intersection is restricted due to the vicinity of the school.

RECOMMENDED IMPROVEMENTS

Table 9 shows the recommended improvements based on auxiliary lane criteria contained in Table 2 of the Town of Erie *Standard & Specifications* section 521.03.09, the projected turning volumes, the projected 95th percentile queue lengths, and the traffic signal warrant analysis. Table 9 also shows the scenario (2035 background, 2045 background, 2035 total or 2045 total) each improvement is anticipated to be required with.

CONCLUSION AND RECOMMENDATIONS

Trip Generation

1. The site is projected to generate about 25,686 vehicle-trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. During the morning peak-hour, about 435 vehicles would enter and about 892 vehicles would exit the site. During the afternoon peak-hour, about 1,220 vehicles would enter and about 923 vehicles would exit the site. These estimates are expected to be reduced due to internal and passby trips as shown in Table 2b.

Projected Levels of Service

2. The existing and future signalized intersections are expected to operate at an overall LOS "D" or better through 2045 with the recommended improvements. Some of the minor movements are expected to operate at LOS "E" or LOS "F". These movements have projected delays in the LOS "E" or LOS "F" range simply because they arrive at the traffic signal at the beginning of the red phase at an intersection with many phases and a long cycle length. These movements would not be considered "failing" since their volume-to-capacity ratios are less than one. The justification is that to progress through traffic along an arterial corridor, the traffic signal offsets and left-turn phase times have been adjusted to favor the through band, which can result in higher delay for the left-turn movements even though there is sufficient capacity for them.

3. All movements at the unsignalized intersections, except for CR 5/South High School Access (#21) and CR 5/South High School Access (#22), are expected to operate at LOS "D" or better through 2045 with the recommended improvements. The westbound approach at the north high school access to CR 5 (#21) is expected to operate at LOS "E" during the afternoon peak-hour by 2045. The traffic signals located north and south of this intersection will likely create gaps in the through traffic for this movement to more easily occur. The westbound approach at the south high school access to CR 5 (#22) is expected to operate at LOS "F" during afternoon peak-hour by 2035. The west leg of this intersection is currently restricted to right-in/right-out only. To maintain an acceptable level of service it may be necessary to restrict the east leg to three-quarter movement (left-in/right-in/right-out only).

Conclusions

4. This analysis finds the impact of the North Westerly mixed-use development can be accommodated by the existing and proposed roadway network with implementation of the following recommendations.

Recommendations

5. The recommended improvements are shown in Figures 8c, 8d, 9c, and 9d, Table 8, and Table 9.

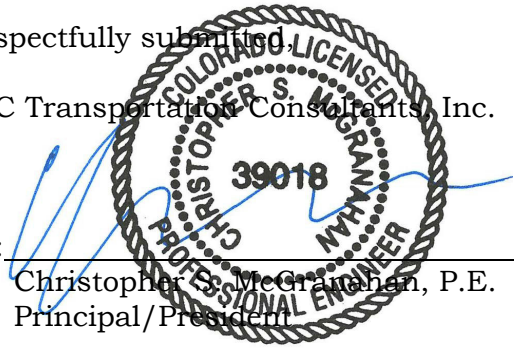
6. Over time, the applicant or its successors will construct all internal roadways and half of the ultimate four-lane Principal Arterial sections of Erie Parkway and CR 7 that front the site as part of the development process. The timing of specific improvements will likely be determined with future compliance letters or filing specific traffic studies.

* * *

We trust this information will assist you in planning for the proposed North Westerly mixed-use development.

Respectfully submitted,

LSC Transportation Consultants, Inc.



By: _____
Christopher S. McGranahan, P.E.
Principal/President

CSM/wc 4-18-25

Enclosures: Tables 1 - 9
Figures 1 - 9b
Traffic Count Reports
Level of Service Definitions
Level of Service Reports
Queuing Reports
Key pages from area traffic studies

G:\Shared drives\Denver Projects 2021-2030\2022\221032-NorthWesterly\Report\2025 04 April\NorthWesterly-041825.wpd

Table 1 (Page 1 of 7)
Intersection Levels of Service Analysis
North Westerly
Erie, CO
LSC #221032; April, 2025

Intersection No. & Location	Traffic Control	Existing Traffic Level of Service AM	Existing Traffic Level of Service PM	2035 Background Traffic Level of Service AM	2035 Background Traffic Level of Service PM	2035 Total Traffic Level of Service AM	2035 Total Traffic Level of Service PM	2045 Background Traffic Level of Service AM	2045 Background Traffic Level of Service PM	2045 Total Traffic Level of Service AM	2045 Total Traffic Level of Service PM
1) CR 5/CR 10	TWSC										
NB Left		A	A	--	--	--	--	--	--	--	--
EB Left		C	B	--	--	--	--	--	--	--	--
EB Through/Right or Through		B	B	--	--	--	--	--	--	--	--
EB Right		--	--	--	--	--	--	--	--	--	--
WB Approach		D	C	--	--	--	--	--	--	--	--
WB Left		--	--	--	--	--	--	--	--	--	--
WB Through		--	--	--	--	--	--	--	--	--	--
WB Right		--	--	--	--	--	--	--	--	--	--
SB Left/Through or Left		A	A	--	--	--	--	--	--	--	--
Critical Movement Delay		25.1	15.0	--	--	--	--	--	--	--	--
	Roundabout										
EB Approach		--	--	A	A	A	B	B	B	B	C
WB Approach		--	--	A	A	A	A	B	B	B	B
NB Approach		--	--	A	A	A	A	A	C	B	D
SB Approach		--	--	A	A	A	B	A	C	B	D
Entire Intersection Delay (sec /veh)		--	--	8.8	8.3	8.3	10.6	11.0	16.8	12.3	26.4
Entire Intersection LOS				A	A	A	B	B	C	B	D
2) CR 10/Three-Quarter Movement Site Access	TWSC										
NB Right		--	--	--	--	A	A	--	--	A	B
WB Left		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	9.1	9.5	--	--	9.7	10.6

Table 1 (Page 2 of 7)
Intersection Levels of Service Analysis
North Westerly
Erie, CO
LSC #221032; April, 2025

Intersection No. & Location	Traffic Control	Existing Traffic Level of Service AM	Existing Traffic Level of Service PM	2035 Background Traffic Level of Service AM	2035 Background Traffic Level of Service PM	2035 Total Traffic Level of Service AM	2035 Total Traffic Level of Service PM	2045 Background Traffic Level of Service AM	2045 Background Traffic Level of Service PM	2045 Total Traffic Level of Service AM	2045 Total Traffic Level of Service PM
3) CR 10/Major North-South Collector	TWSC										
NB Left		--	--	--	--	B	B	--	--	B	B
NB Right		--	--	--	--	A	A	--	--	A	B
WB Left		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	10.8	11.3	--	--	13.5	14.7
4) CR 7/CR 10	TWSC										
NB Approach or NB Left/Through		A	A	A	A	A	A	--	--	--	--
EB Approach		B	B	B	D	--	--	--	--	--	--
EB Left		--	--	--	--	C	E	--	--	--	--
EB Through/Right		--	--	--	--	C	C	--	--	--	--
WB Approach		B	C	C	D	--	--	--	--	--	--
WB Left		--	--	--	--	C	F	--	--	--	--
WB Through/Right		--	--	--	--	C	D	--	--	--	--
SB Approach or SB Left/Through		A	A	A	A	A	A	--	--	--	--
Critical Movement Delay		12.8	15.2	18.4	29.5	24.7	52.3	--	--	--	--
	Signalized										
EB Left		--	--	--	--	--	--	D	C	D	C
EB Through		--	--	--	--	--	--	D	D	D	D
EB Right		--	--	--	--	--	--	D	D	D	D
WB Left		--	--	--	--	--	--	D	C	D	C
WB Through/Right		--	--	--	--	--	--	D	D	D	D
NB Left		--	--	--	--	--	--	A	B	A	B
NB Through		--	--	--	--	--	--	A	B	A	B
NB Right		--	--	--	--	--	--	A	B	A	B
SB Left		--	--	--	--	--	--	A	B	A	B
SB Through		--	--	--	--	--	--	A	B	B	B
SB Right		--	--	--	--	--	--	A	B	A	B
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--	22.3	23.1	23.0	23.0
Entire Intersection LOS		--	--	--	--	--	--	C	C	C	C

Table 1 (Page 3 of 7)
Intersection Levels of Service Analysis
North Westerly
Erie, CO
LSC #221032; April, 2025

Intersection No. & Location	Traffic Control	Existing Traffic Level of Service AM	Existing Traffic Level of Service PM	2035 Background Traffic Level of Service AM	2035 Background Traffic Level of Service PM	2035 Total Traffic Level of Service AM	2035 Total Traffic Level of Service PM	2045 Background Traffic Level of Service AM	2045 Background Traffic Level of Service PM	2045 Total Traffic Level of Service AM	2045 Total Traffic Level of Service PM
5) CR 5/Erie Parkway	Signalized										
EB Left		D	B	F	F	E	D	D	C	E	D
EB Through		C	D	F	F	C	D	C	C	C	C
EB Right		B	B	C	C	C	C	C	C	C	C
WB Left		B	C	C	C	C	C	C	C	C	C
WB Through		D	C	F	D	D	D	C	C	D	C
WB Right		C	C	C	C	D	D	C	D	D	D
NB Left		C	C	F	F	E	D	E	D	E	D
NB Through/Right or Through		D	D	C	D	D	D	D	D	D	D
NB Right		--	--	C	C	D	D	D	D	D	D
SB Left		D	D	F	F	E	E	E	D	E	D
SB Through		C	C	C	C	D	D	D	D	D	D
SB Right (1)		C	C	D	C	E	D	F	D	F	D
Entire Intersection Delay (sec /veh)		34.5	34.5	112.5	113.6	47.0	46.4	43.3	34.0	51.4	40.7
Entire Intersection LOS		C	C	F	F	D	D	D	C	D	D
6) Erie Parkway/Westerly Boulevard/ North Westerly Right-in/Right-out	TWSC										
NB Right		B	C	E	F	C	D	C	C	C	D
WB Left		A	A	B	C	B	C	B	C	B	D
SB Right		--	--	--	--	C	C	--	--	C	C
Critical Movement Delay		14.8	16.6	44.1	68.8	17.6	25.0	16.3	22.9	19.5	30.2
7) Erie Parkway/Waterford Street/ Major North-South Collector	TWSC										
NB Right		B	C	--	--	--	--	--	--	--	--
WB Through/Left		A	A	--	--	--	--	--	--	--	--
Critical Movement Delay		14.4	16.2	--	--	--	--	--	--	--	--
	Signalized										
EB Left		--	--	--	--	B	B	--	--	B	D
EB Through		--	--	C	F	C	C	B	B	C	D
EB Right		--	--	A	A	B	B	A	A	B	B
WB Left		--	--	C	D	B	C	A	B	B	D
WB Through		--	--	B	A	C	B	A	A	C	C
WB Right		--	--	--	--	B	B	--	--	B	B
NB Left		--	--	D	D	D	D	D	D	D	D
NB Right or Through/Right		--	--	D	D	D	D	D	D	D	D
SB Left		--	--	--	--	D	D	--	--	D	D
SB Through/Right		--	--	--	--	D	D	--	--	D	D
Entire Intersection Delay (sec /veh)		--	--	28.2	45.1	27.1	23.4	14.4	11.2	28.4	35.9
Entire Intersection LOS		--	--	C	D	C	C	B	B	C	D

Notes:
(1) May need an overlap phase or acceleration lane by 2045

Table 1 (Page 4 of 7)
Intersection Levels of Service Analysis
North Westerly
Erie, CO
LSC #221032; April, 2025

Intersection No. & Location	Traffic Control	Existing Traffic Level of Service AM	Existing Traffic Level of Service PM	2035 Background Traffic Level of Service AM	2035 Background Traffic Level of Service PM	2035 Total Traffic Level of Service AM	2035 Total Traffic Level of Service PM	2045 Background Traffic Level of Service AM	2045 Background Traffic Level of Service PM	2045 Total Traffic Level of Service AM	2045 Total Traffic Level of Service PM
8) Erie Parkway/Future Access/ Minor North-South Collector	Signalized										
EB Left		--	--	--	--	A	B	--	--	B	E
EB Through		--	--	--	--	A	A	A	B	B	D
EB Right		--	--	--	--	--	--	A	B	A	B
WB Left		--	--	--	--	--	--	A	C	B	E
WB Through		--	--	--	--	A	B	A	A	B	D
WB Right		--	--	--	--	A	A	--	--	B	C
NB Left		--	--	--	--	--	--	D	D	D	D
NB Right or Through/Right		--	--	--	--	--	--	D	D	D	E
SB Left		--	--	--	--	C	D	--	--	D	E
SB Through/Right		--	--	--	--	C	D	--	--	D	D
Entire Intersection Delay (sec /veh)		--	--	--	--	7.3	13.1	7.0	18.8	18.9	47.2
Entire Intersection LOS		--	--	--	--	A	B	A	B	B	D
9) Erie Parkway/CR 7	Signalized										
EB Left		B	B	C	C	B	C	B	C	C	C
EB Through		B	C	F	F	C	D	C	C	C	D
EB Right		B	B	B	B	B	C	B	B	B	B
WB Left		B	B	D	D	B	D	C	D	C	E
WB Through/Right or Through		C	C	F	F	B	C	C	C	C	C
WB Right		--	--	--	--	B	C	B	B	B	C
NB Left		D	C	D	C	D	C	C	C	D	E
NB Through/Right or Through		D	D	D	E	D	E	D	D	D	D
NB Right		--	--	--	--	D	D	D	D	D	D
SB Left		C	D	C	F	D	D	D	D	D	E
SB Through/Right or Through		D	D	D	D	E	D	D	D	D	D
SB Right		--	--	--	--	D	C	D	D	D	D
Entire Intersection Delay (sec /veh)		23.5	27.9	87.6	225.2	26.5	43.7	27.9	33.7	31.1	44.6
Entire Intersection LOS		C	C	F	F	C	D	C	C	C	D
10) CR 5/Three-Quarter Movement Site Access	TWSC										
WB Right		--	--	--	--	B	B	--	--	B	B
SB Left		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	12.1	11.9	--	--	12.9	14.5

Table 1 (Page 5 of 7)
Intersection Levels of Service Analysis
North Westerly
Erie, CO
LSC #221032; April, 2025

Intersection No. & Location	Traffic Control	Existing Traffic Level of Service AM	Existing Traffic Level of Service PM	2035 Background Traffic Level of Service AM	2035 Background Traffic Level of Service PM	2035 Total Traffic Level of Service AM	2035 Total Traffic Level of Service PM	2045 Background Traffic Level of Service AM	2045 Background Traffic Level of Service PM	2045 Total Traffic Level of Service AM	2045 Total Traffic Level of Service PM
11) CR 5/Flora View Drive	Signalized										
EB Left		C	C	C	C	C	C	C	C	C	C
EB Through		D	C	D	C	D	C	D	C	D	C
EB Right		D	C	D	D	D	D	D	D	D	D
WB Left		C	C	C	C	D	C	C	C	D	C
WB Through/Right or Through		C	C	C	C	C	C	D	D	C	C
WB Right		--	--	--	--	C	C	--	--	D	D
NB Left		B	A	B	B	C	B	B	B	B	B
NB Through		B	B	C	B	D	B	B	B	B	C
NB Right		B	A	B	A	B	B	B	B	B	B
SB Left		B	A	B	B	D	B	B	B	B	B
SB Through		B	B	C	B	D	B	C	B	C	B
SB Right		B	A	B	B	B	B	B	B	B	B
Entire Intersection Delay (sec /veh)		21.9	15.1	28.5	19.2	37.4	20.0	23.8	21.2	24.6	22.7
Entire Intersection LOS		C	B	C	B	D	B	C	C	C	C
12) CR 7/CR 8.75	TWSC										
NB Left/Through or Left		A	A	A	A	A	A	A	A	A	A
EB Approach		A	B	A	B	A	B	A	B	A	B
Critical Movement Delay		7.8	11.4	8.3	11.3	8.3	12.2	8.2	10.9	8.3	11.3
13) CR 7/Flora View Drive	TWSC										
NB Left		--	--	--	--	A	A	--	--	--	--
EB Left		--	--	--	--	C	D	--	--	--	--
EB Right		--	--	--	--	B	B	--	--	--	--
Critical Movement Delay		--	--	--	--	16.8	29.0	--	--	--	--
	Signalized										
EB Left		--	--	--	--	--	--	A	A	D	D
EB Right or Through/Right		--	--	--	--	--	--	D	D	D	D
WB Left		--	--	--	--	--	--	D	D	D	D
WB Through/Right		--	--	--	--	--	--	D	C	D	C
NB Left		--	--	--	--	--	--	A	A	B	B
NB Through		--	--	--	--	--	--	B	B	B	B
NB Right		--	--	--	--	--	--	B	C	B	C
SB Left		--	--	--	--	--	--	B	B	B	B
SB Through		--	--	--	--	--	--	B	B	B	C
SB Right		--	--	--	--	--	--	A	A	B	B
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--	26.3	24.3	25.8	27.9
Entire Intersection LOS		--	--	--	--	--	--	C	C	C	C

Table 1 (Page 6 of 7)
Intersection Levels of Service Analysis
North Westerly
Erie, CO
LSC #221032; April, 2025

Intersection No. & Location	Traffic Control	Existing Traffic Level of Service AM	Existing Traffic Level of Service PM	2035 Background Traffic Level of Service AM	2035 Background Traffic Level of Service PM	2035 Total Traffic Level of Service AM	2035 Total Traffic Level of Service PM	2045 Background Traffic Level of Service AM	2045 Background Traffic Level of Service PM	2045 Total Traffic Level of Service AM	2045 Total Traffic Level of Service PM
14) This Access is no Longer Proposed											
15) CR 7/	TWSC										
North Three-Quarter Movement Site Access											
NB Left		--	--	--	--	A	A	--	--	A	B
EB Right		--	--	--	--	B	B	--	--	B	B
Critical Movement Delay		--	--	--	--	11.6	12.4	--	--	10.8	13.0
16) CR 7/	TWSC										
South Three-Quarter Movement Site Access											
NB Left		--	--	--	--	A	A	--	--	A	B
EB Right		--	--	--	--	B	B	--	--	B	B
Critical Movement Delay		--	--	--	--	11.7	12.1	--	--	11.0	12.8
17) This Access is no Longer Proposed											
18) Flora View Drive/Major North-South Collector	TWSC										
EB Approach		--	--	--	--	A	A	--	--	A	A
WB Approach		--	--	--	--	A	A	--	--	A	A
NB Approach		--	--	--	--	A	A	--	--	A	A
SB Approach		--	--	--	--	A	A	--	--	A	A
Entire Intersection Delay (sec /veh)		--	--	--	--	3.5	3.8	--	--	4.1	4.6
Entire Intersection LOS		--	--	--	--	A	A	--	--	A	A
19) Flora View Drive/Minor North-South Collector	TWSC										
NB Left		--	--	--	--	A	A	--	--	B	B
NB Right		--	--	--	--	A	A	--	--	A	A
WB Left		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	9.1	9.2	--	--	10.4	11.1

Table 1 (Page 7 of 7)
Intersection Levels of Service Analysis
North Westerly
Erie, CO
LSC #221032; April, 2025

Intersection No. & Location	Traffic Control	Existing Traffic Level of Service AM	Existing Traffic Level of Service PM	2035 Background Traffic Level of Service AM	2035 Background Traffic Level of Service PM	2035 Total Traffic Level of Service AM	2035 Total Traffic Level of Service PM	2045 Background Traffic Level of Service AM	2045 Background Traffic Level of Service PM	2045 Total Traffic Level of Service AM	2045 Total Traffic Level of Service PM
20) CR 5/North High School Access	TWSC										
WB Approach		B	B	C	C	C	D	C	D	C	E
SB Left		A	A	A	A	B	A	A	A	A	B
Critical Movement Delay		13.6	12.5	19.2	22.6	21.2	27.1	19.2	27.0	21.2	36.5
21) WCR 5/Colliers Parkway/Erie High School	Signalized										
EB Left		D	D	D	D	D	D	D	D	C	D
EB Through		D	D	D	D	D	D	C	D	C	D
EB Right		D	D	D	D	D	D	D	D	D	D
WB Left		D	D	D	D	D	D	D	D	D	D
WB Through/Right		C	D	C	D	D	D	C	D	C	D
NB Left		B	A	B	A	B	A	C	A	C	A
NB Through		C	A	C	A	C	A	C	A	C	A
NB Right		C	A	C	A	B	A	C	A	C	A
SB Left		B	A	B	A	B	A	B	A	C	A
SB Through		B	A	C	B	C	B	C	B	C	B
SB Right		B	A	B	A	B	A	C	A	C	A
Entire Intersection Delay (sec /veh)		32.8	16.2	31.8	14.2	28.0	13.9	32.1	14.5	32.7	14.4
Entire Intersection LOS		C	B	C	B	C	B	C	B	C	B
22) CR 5/South High School Access	TWSC										
EB Right		B	A	C	B	C	B	C	B	C	B
WB Approach		B	C	C	E	D	F	D	F	D	F
SB Left		B	A	C	B	C	B	B	B	C	B
Critical Movement Delay		13.5	18.3	22.9	48.1	26.5	50.4	25.3	63.2	30.6	92.1
23) Major North-South Collector/East-West Local	TWSC										
WB Approach		--	--	--	--	B	B	--	--	B	B
SB Left		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	10.8	11.5	--	--	10.8	11.5
24) Minor North-South Collector/East-West Local	AWSC										
NB Approach		--	--	--	--	A	B	--	--	A	B
EB Approach		--	--	--	--	A	A	--	--	A	A
WB Approach		--	--	--	--	A	A	--	--	A	A
SB Approach		--	--	--	--	A	B	--	--	A	B
Entire Intersection Delay (sec /veh)		--	--	--	--	8.0	11.1	--	--	8.0	11.1
Entire Intersection LOS		--	--	--	--	A	B	--	--	A	B

Table 2a
Trip Generation Estimate
North Westerly
Erie, CO
LSC #221032, April 2025

Phase	Land Use Description	Trip Generation Units	Trip Generation Rates [1] Average Weekday Traffic	Morning Peak Hour In	Morning Peak Hour Out	Afternoon Peak Hour In	Afternoon Peak Hour Out	Total Trips Generated Average Weekday Traffic	Morning Peak Hour In	Morning Peak Hour Out	Afternoon Peak Hour In	Afternoon Peak Hour Out
1	Single Family Detached Housing[2]	105 DU[3]	9.43	0.175	0.525	0.592	0.348	990	18	55	62	37
	Single Family Attached Housing[4]	115 DU	7.20	0.120	0.360	0.336	0.234	828	14	41	39	27
	Multifamily Housing[5]	250 DU	6.74	0.096	0.304	0.321	0.189	1,685	24	76	80	47
2	Single Family Attached Housing	110 DU	7.20	0.120	0.360	0.336	0.234	792	13	40	37	26
	Commercial[6]	100 KSF[7]	67.52	1.073	0.657	2.543	2.647	6,752	107	66	254	265
3	Single Family Detached Housing	136 DU	9.43	0.175	0.525	0.592	0.348	1,282	24	71	81	47
4	Single Family Attached Housing	140 DU	7.20	0.120	0.360	0.336	0.234	1,008	17	50	47	33
	Commercial	50 KSF	67.52	1.073	0.657	2.543	2.647	3,376	54	33	127	132
5	Single Family Detached Housing	125 DU	9.43	0.175	0.525	0.592	0.348	1,179	22	66	74	43
6	Single Family Detached Housing	224 DU	9.43	0.175	0.525	0.592	0.348	2,112	39	118	133	78
	Single Family Attached Housing	62 DU	7.20	0.120	0.360	0.336	0.234	446	7	22	21	14
7	Single Family Detached Housing	78 DU	9.43	0.175	0.525	0.592	0.348	736	14	41	46	27
	Single Family Attached Housing	249 DU	7.20	0.120	0.360	0.336	0.234	1,793	30	90	84	58
8	Single Family Detached Housing	16 DU	9.43	0.175	0.525	0.592	0.348	151	3	8	9	6
	Single Family Attached Housing	24 DU	7.20	0.120	0.360	0.336	0.234	173	3	9	8	6
	Senior Adult Housing - Single Family[8]	191 DU	4.31	0.079	0.161	0.183	0.117	823	15	31	35	22
	Senior Adult Housing - Multifamily[9]	237 DU	3.24	0.068	0.132	0.140	0.110	768	16	31	33	26
9	Single Family Detached Housing	84 DU	9.43	0.175	0.525	0.592	0.348	792	15	44	50	29
						Grand Total		**25,686**	**435**	**892**	**1,220**	**923**
						Internal Trips[10]		**1,796**	**13**	**13**	**79**	**79**
						External Trips (Total Trips - Internal Trips)		**23,890**	**422**	**879**	**1,141**	**844**
						Pass-By Trips[10]		**3,692**	**49**	**49**	**140**	**140**
						Primary Vehicle Trips (New External Trips = Total Trips - Internal Trips - Passby Trips)		**20,198**	**373**	**830**	**1,001**	**704**

Notes:

(1) Source: *Trip Generation, Institute of Transportation Engineers* , 11th Edition, 2021.

(2) ITE Land Use No. 210 - Single-Family Detached Housing

(3) DU = dwelling unit

(4) ITE Land Use No. 215 - Single-Family Attached Housing

(5) ITE Land Use No. 221 - Multifamily Housing (Low-Rise)

(6) ITE Land Use No. 821 - Shopping Plaza (40-150 KSF No Supermarket)

(7) KSF = 1,000 square feet of floor space

(8) ITE Land Use No. 251 - Senior Adult Housing - Single Family

(9) ITE Land Use No. 252 - Senior Adult Housing - Multifamily

(10) See Table 2b

Source: LSC Transportation Consultants, Inc.

Table 2b
Internal and Passby Trip Calculation
North Westerly
Erie, CO
LSC #221032, April 2025

Land Use	ITE Code	Quantity	Unit	Raw ITE Trip Generation[1] (Individual Driveway Trips) Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out	Total Internal Trips[2] Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out		Total Passby Trips[3] Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out
Residential Uses																			
Single-Family Detached Housing	210	768	DU[4]	7,242	135	403	455	267											
Single-Family Attached Housing	215	700	DU	5,040	84	252	236	164											
Multifamily Housing (Low-Rise)	220	250	DU	1,685	24	76	80	47	898	5	8	43	36	0%	0	0	0	0	0
Senior Adult Housing - Single-Family	251	191	DU	823	15	31	35	22											
Senior Adult Housing - Multifamily	252	237	DU	768	16	31	33	26											
		2,146	**DU**	**15,558**	**274**	**793**	**839**	**526**											
Non-Residential Uses																			
Shopping Plaza (40-150 KSF No Supermarket)	821	150	KSF[5]	10,128	161	99	381	397	898	8	5	36	43	40%	3,692	49	49	140	140
				25,686	**435**	**892**	**1,220**	**923**	**1,796**	**13**	**13**	**79**	**79**		**3,692**	**49**	**49**	**140**	**140**

Notes:

(1) See Table 2a

(2) Source: NCHRP 684 Internal Trip Capture Estimation Tool

(3) Source Pass-By Data and Rate Tables/2021 Pass-By Tables for ITETripGen Appendices ITE Land Use 821 - Shopping Plaza (40-150 KSF)

(4) DU = dwelling Unit

(5) KSF = 1,000 square feet of floor space

Table 3a
Intersection #4 - CR 7/CR 10
2035 Signal Warrant Analysis
North Westerly
Erie, CO
LSC #221032; April, 2025

Warrant Analysis[1]

	Traffic Volume (vph)[2]			Warrant 1: Eight Hour Vehicular Volume Evaluation								Warrant 2: Four Hour Vehicular Volume Evaluation		
				Warrant Thresholds				Warrant Threshold Met?						
				Condition A (70%)		Condition B (70%)		Minor 1 Leg		Minor 2 Leg		70% Warrant Threshold Minor Minimum	Warrant Threshold Met?	
	Major[3]	Minor 1[4] EB	Minor 2[4] WB	Major	Minor	Major	Minor	A	B	A	B		EB	WB
2035 Background Traffic														
12-1 AM	36	77	6	420	140	630	70	No	No	No	No	Low Vol	No	No
1-2 AM	24	8	5	420	140	630	70	No	No	No	No	Low Vol	No	No
2-3 AM	7	5	6	420	140	630	70	No	No	No	No	Low Vol	No	No
3-4 AM	16	4	5	420	140	630	70	No	No	No	No	Low Vol	No	No
4-5 AM	22	4	6	420	140	630	70	No	No	No	No	Low Vol	No	No
5-6 AM	64	5	12	420	140	630	70	No	No	No	No	Low Vol	No	No
6-7 AM	151	13	19	420	140	630	70	No	No	No	No	Low Vol	No	No
7-8 AM	306	23	43	420	140	630	70	No	No	No	No	351	No	No
8-9 AM	596	38	70	420	140	630	70	No	No	No	No	177	No	No
9-10 AM	347	77	59	420	140	630	70	No	No	No	No	324	No	No
10-11 AM	360	55	71	420	140	630	70	No	No	No	No	316	No	No
11-12 PM	375	33	26	420	140	630	70	No	No	No	No	306	No	No
12-1 PM	301	116	16	420	140	630	70	No	No	No	No	354	No	No
1-2 PM	331	57	22	420	140	630	70	No	No	No	No	335	No	No
2-3 PM	373	63	20	420	140	630	70	No	No	No	No	308	No	No
3-4 PM	507	62	24	420	140	630	70	No	No	No	No	222	No	No
4-5 PM	585	59	30	420	140	630	70	No	No	No	No	183	No	No
5-6 PM	776	74	41	420	140	630	70	No	Yes	No	No	113	No	No
6-7 PM	826	118	50	420	140	630	70	No	Yes	No	No	99	Yes	No
7-8 PM	455	116	20	420	140	630	70	No	No	No	No	254	No	No
8-9 PM	251	42	13	420	140	630	70	No	No	No	No	Low Vol	No	No
9-10 PM	125	34	10	420	140	630	70	No	No	No	No	Low Vol	No	No
10-11 PM	65	25	7	420	140	630	70	No	No	No	No	Low Vol	No	No
11-12 AM	45	17	6	420	140	630	70	No	No	No	No	Low Vol	No	No
				Numbers of hours the thresholds are are met				**0**	**2**	**0**	**0**		**1**	**0**
								Warrant met?	**No**				**No**	
2035 Total Traffic														
12-1 AM	43	122	8	420	140	630	70	No	No	No	No	Low Vol	No	No
1-2 AM	28	8	6	420	140	630	70	No	No	No	No	Low Vol	No	No
2-3 AM	10	5	7	420	140	630	70	No	No	No	No	Low Vol	No	No
3-4 AM	20	4	5	420	140	630	70	No	No	No	No	Low Vol	No	No
4-5 AM	31	5	7	420	140	630	70	No	No	No	No	Low Vol	No	No
5-6 AM	82	8	14	420	140	630	70	No	No	No	No	Low Vol	No	No
6-7 AM	207	22	26	420	140	630	70	No	No	No	No	Low Vol	No	No
7-8 AM	408	50	55	420	140	630	70	No	No	No	No	285	No	No
8-9 AM	696	83	85	420	140	630	70	No	Yes	No	Yes	141	No	No
9-10 AM	426	116	72	420	140	630	70	No	No	No	No	273	No	No
10-11 AM	448	81	88	420	140	630	70	No	No	No	No	259	No	No
11-12 PM	475	59	47	420	140	630	70	No	No	No	No	241	No	No
12-1 PM	405	144	32	420	140	630	70	No	No	No	No	287	No	No
1-2 PM	443	79	40	420	140	630	70	No	No	No	No	262	No	No
2-3 PM	495	86	40	420	140	630	70	No	No	No	No	228	No	No
3-4 PM	644	85	48	420	140	630	70	No	Yes	No	No	160	No	No
4-5 PM	750	83	60	420	140	630	70	No	Yes	No	No	123	No	No
5-6 PM	935	102	69	420	140	630	70	No	Yes	No	No	94	Yes	No
6-7 PM	958	146	74	420	140	630	70	Yes	Yes	No	Yes	103	Yes	No
7-8 PM	549	138	38	420	140	630	70	No	No	No	No	201	No	No
8-9 PM	337	58	31	420	140	630	70	No	No	No	No	331	No	No
9-10 PM	187	47	22	420	140	630	70	No	No	No	No	Low Vol	No	No
10-11 PM	94	35	13	420	140	630	70	No	No	No	No	Low Vol	No	No
11-12 AM	63	20	10	420	140	630	70	No	No	No	No	Low Vol	No	No
				Numbers of hours the thresholds are are met				**1**	**5**	**0**	**2**		**2**	**0**
								Warrant met?	**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) Off peak hour traffic volumes are estimates by LSC based on 24-hour machine counts conducted by LSC on CR 10 and CR 7 in October 2024 and ITE Vehicle Time of Day Distribution Data
(3) The major street traffic includes all movements (left, through, and right)
(4) The minor street traffic includes left, through, and half of right-turn volumes from the minor street

Source: LSC Transportation Consultants, Inc.

Table 3b
Intersection #4 - CR 7/CR 10
2045 Signal Warrant Analysis
North Westerly
Erie, CO
LSC #221032; April, 2025

Warrant Analysis[1]

	Traffic Volume (vph)[2]			Warrant 1: Eight Hour Vehicular Volume Evaluation								Warrant 2: Four Hour Vehicular Volume Evaluation		
				Warrant Thresholds				Warrant Threshold Met?						
				Condition A (70%)		Condition B (70%)		Minor 1 Leg		Minor 2 Leg		70% Warrant Threshold Minor Minimum	Warrant Threshold Met?	
	Major[3]	Minor 1[4] EB	Minor 2[4] WB	Major	Minor	Major	Minor	A	B	A	B		EB	WB
2045 Background Traffic														
12-1 AM	39	150	12	420	140	630	70	No	No	No	No	Low Vol	No	No
1-2 AM	24	13	10	420	140	630	70	No	No	No	No	Low Vol	No	No
2-3 AM	7	10	11	420	140	630	70	No	No	No	No	Low Vol	No	No
3-4 AM	14	8	10	420	140	630	70	No	No	No	No	Low Vol	No	No
4-5 AM	20	8	12	420	140	630	70	No	No	No	No	Low Vol	No	No
5-6 AM	69	10	25	420	140	630	70	No	No	No	No	Low Vol	No	No
6-7 AM	164	26	36	420	140	630	70	No	No	No	No	Low Vol	No	No
7-8 AM	341	44	88	420	140	630	70	No	No	No	No	328	No	No
8-9 AM	665	72	141	420	140	630	70	No	Yes	Yes	Yes	152	No	No
9-10 AM	364	150	116	420	140	630	70	No	No	No	No	313	No	No
10-11 AM	376	106	144	420	140	630	70	No	No	No	No	306	No	No
11-12 PM	387	66	51	420	140	630	70	No	No	No	No	298	No	No
12-1 PM	369	219	43	420	140	630	70	No	No	No	No	310	No	No
1-2 PM	404	106	56	420	140	630	70	No	No	No	No	287	No	No
2-3 PM	455	119	53	420	140	630	70	No	No	No	No	254	No	No
3-4 PM	608	118	64	420	140	630	70	No	No	No	No	172	No	No
4-5 PM	710	113	79	420	140	630	70	No	Yes	No	Yes	137	No	No
5-6 PM	957	137	107	420	140	630	70	No	Yes	No	Yes	103	Yes	Yes
6-7 PM	1018	224	131	420	140	630	70	Yes	Yes	No	Yes	113	Yes	Yes
7-8 PM	570	219	52	420	140	630	70	Yes	No	No	No	190	Yes	No
8-9 PM	316	78	34	420	140	630	70	No	No	No	No	345	No	No
9-10 PM	161	62	25	420	140	630	70	No	No	No	No	Low Vol	No	No
10-11 PM	80	47	16	420	140	630	70	No	No	No	No	Low Vol	No	No
11-12 AM	55	32	15	420	140	630	70	No	No	No	No	Low Vol	No	No
				Numbers of hours the thresholds are are met				**2**	**4**	**1**	**4**		**3**	**2**
								Warrant met?	**No**				**No**	
2045 Total Traffic														
12-1 AM	46	195	14	420	140	630	70	No	No	No	No	Low Vol	No	No
1-2 AM	28	13	11	420	140	630	70	No	No	No	No	Low Vol	No	No
2-3 AM	10	10	12	420	140	630	70	No	No	No	No	Low Vol	No	No
3-4 AM	18	8	10	420	140	630	70	No	No	No	No	Low Vol	No	No
4-5 AM	29	9	13	420	140	630	70	No	No	No	No	Low Vol	No	No
5-6 AM	87	13	27	420	140	630	70	No	No	No	No	Low Vol	No	No
6-7 AM	220	35	43	420	140	630	70	No	No	No	No	Low Vol	No	No
7-8 AM	443	71	100	420	140	630	70	No	No	No	No	262	No	No
8-9 AM	765	117	156	420	140	630	70	No	Yes	Yes	Yes	117	No	Yes
9-10 AM	443	189	129	420	140	630	70	Yes	No	No	No	262	No	No
10-11 AM	464	132	161	420	140	630	70	No	No	Yes	No	248	No	No
11-12 PM	487	92	72	420	140	630	70	No	No	No	No	233	No	No
12-1 PM	473	247	59	420	140	630	70	Yes	No	No	No	243	Yes	No
1-2 PM	516	128	74	420	140	630	70	No	No	No	No	217	No	No
2-3 PM	577	142	73	420	140	630	70	Yes	No	No	No	187	No	No
3-4 PM	745	141	88	420	140	630	70	Yes	Yes	No	Yes	124	Yes	No
4-5 PM	875	137	109	420	140	630	70	No	Yes	No	Yes	86	Yes	Yes
5-6 PM	1116	165	135	420	140	630	70	Yes	Yes	No	Yes	80	Yes	Yes
6-7 PM	1150	252	155	420	140	630	70	Yes	Yes	Yes	Yes	80	Yes	Yes
7-8 PM	664	241	70	420	140	630	70	Yes	Yes	No	No	153	Yes	No
8-9 PM	402	94	52	420	140	630	70	No	No	No	No	289	No	No
9-10 PM	223	75	37	420	140	630	70	No	No	No	No	Low Vol	No	No
10-11 PM	109	57	22	420	140	630	70	No	No	No	No	Low Vol	No	No
11-12 AM	73	35	19	420	140	630	70	No	No	No	No	Low Vol	No	No
				Numbers of hours the thresholds are are met				**7**	**6**	**3**	**5**		**6**	**4**
								Warrant met?	**Approaching**				**Yes**	

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) Off peak hour traffic volumes are estimates by LSC based on 24-hour machine counts conducted by LSC on CR 10 and CR 7 in October 2024 and ITE Vehicle Time of Day Distribution Data
(3) The major street traffic includes all movements (left, through, and right)
(4) The minor street traffic includes left, through, and half of right-turn volumes from the minor street

Source: LSC Transportation Consultants, Inc.

Table 4
Intersection #7 - Erie Parkway/Waterford Street/Major North-South Collector
2035 Signal Warrant Analysis
North Westerly
Erie, CO
LSC #221032; April, 2025

Warrant Analysis[1]

	Traffic Volume (vph)[2]			Warrant 1: Eight Hour Vehicular Volume Evaluation								Warrant 2: Four Hour Vehicular Volume Evaluation		
				Warrant Thresholds				Warrant Threshold Met?						
				Condition A (70%)		Condition B (70%)		NB Leg		SB Leg		70% Warrant Threshold Minor Minimum	Warrant Threshold Met?	
	Major[3]	Minor 1[4] NB	Minor 2[4] SB	Major	Minor	Major	Minor	A	B	A	B		NB	SB
2035 Background Traffic														
12-1 AM	96	13	0	420	140	630	70	No	No	No	No	Low Vol	No	No
1-2 AM	79	11	0	420	140	630	70	No	No	No	No	Low Vol	No	No
2-3 AM	91	13	0	420	140	630	70	No	No	No	No	Low Vol	No	No
3-4 AM	123	18	0	420	140	630	70	No	No	No	No	Low Vol	No	No
4-5 AM	246	34	0	420	140	630	70	No	No	No	No	Low Vol	No	No
5-6 AM	625	88	0	420	140	630	70	No	No	No	No	166	No	No
6-7 AM	932	127	0	420	140	630	70	No	Yes	No	No	93	Yes	No
7-8 AM	1395	184	0	420	140	630	70	Yes	Yes	No	No	80	Yes	No
8-9 AM	2232	316	0	420	140	630	70	Yes	Yes	No	No	80	Yes	No
9-10 AM	1238	181	0	420	140	630	70	Yes	Yes	No	No	80	Yes	No
10-11 AM	1023	158	0	420	140	630	70	Yes	Yes	No	No	111	Yes	No
11-12 PM	867	133	0	420	140	630	70	No	Yes	No	No	88	Yes	No
12-1 PM	801	56	0	420	140	630	70	No	No	No	No	105	No	No
1-2 PM	747	50	0	420	140	630	70	No	No	No	No	124	No	No
2-3 PM	749	50	0	420	140	630	70	No	No	No	No	123	No	No
3-4 PM	1057	64	0	420	140	630	70	No	No	No	No	97	No	No
4-5 PM	1512	87	0	420	140	630	70	No	Yes	No	No	80	Yes	No
5-6 PM	2327	133	0	420	140	630	70	No	Yes	No	No	80	Yes	No
6-7 PM	2722	167	0	420	140	630	70	Yes	Yes	No	No	80	Yes	No
7-8 PM	1272	77	0	420	140	630	70	No	Yes	No	No	80	No	No
8-9 PM	520	33	0	420	140	630	70	No	No	No	No	215	No	No
9-10 PM	260	16	0	420	140	630	70	No	No	No	No	Low Vol	No	No
10-11 PM	206	12	0	420	140	630	70	No	No	No	No	Low Vol	No	No
11-12 AM	164	10	0	420	140	630	70	No	No	No	No	Low Vol	No	No
				Numbers of hours the thresholds are are met				**5**	**10**	**0**	**0**		**9**	**0**
								Warrant met?	**Yes**				**Yes**	
2035 Total Traffic														
12-1 AM	119	13	7	420	140	630	70	No	No	No	No	Low Vol	No	No
1-2 AM	91	11	4	420	140	630	70	No	No	No	No	Low Vol	No	No
2-3 AM	102	13	4	420	140	630	70	No	No	No	No	Low Vol	No	No
3-4 AM	133	18	3	420	140	630	70	No	No	No	No	Low Vol	No	No
4-5 AM	269	34	5	420	140	630	70	No	No	No	No	Low Vol	No	No
5-6 AM	669	88	7	420	140	630	70	No	Yes	No	No	151	No	No
6-7 AM	1070	127	23	420	140	630	70	No	Yes	No	No	92	Yes	No
7-8 AM	1649	184	45	420	140	630	70	Yes	Yes	No	No	80	Yes	No
8-9 AM	2500	316	56	420	140	630	70	Yes	Yes	No	No	80	Yes	No
9-10 AM	1454	181	49	420	140	630	70	Yes	Yes	No	No	80	Yes	No
10-11 AM	1274	158	62	420	140	630	70	Yes	Yes	No	No	80	Yes	No
11-12 PM	1166	133	80	420	140	630	70	No	Yes	No	Yes	80	Yes	Yes
12-1 PM	1191	56	17	420	140	630	70	No	No	No	No	80	No	No
1-2 PM	1161	50	18	420	140	630	70	No	No	No	No	80	No	No
2-3 PM	1197	50	21	420	140	630	70	No	No	No	No	80	No	No
3-4 PM	1557	64	26	420	140	630	70	No	No	No	No	80	No	No
4-5 PM	2110	87	31	420	140	630	70	No	Yes	No	No	80	Yes	No
5-6 PM	2908	133	30	420	140	630	70	No	Yes	No	No	80	Yes	No
6-7 PM	3201	167	25	420	140	630	70	Yes	Yes	No	No	80	Yes	No
7-8 PM	1616	77	18	420	140	630	70	No	Yes	No	No	80	No	No
8-9 PM	822	33	18	420	140	630	70	No	No	No	No	100	No	No
9-10 PM	480	16	13	420	140	630	70	No	No	No	No	238	No	No
10-11 PM	307	12	6	420	140	630	70	No	No	No	No	350	No	No
11-12 AM	226	10	4	420	140	630	70	No	No	No	No	Low Vol	No	No
				Numbers of hours the thresholds are are met				**5**	**11**	**0**	**1**		**9**	**1**
								Warrant met?	**Yes**				**Yes**	

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) Off peak hour traffic volumes are estimates by LSC based on 24-hour machine counts conducted by LSC on Erie Parkway in October 2024 and ITE Vehicle Time of Day Distribution Data
(3) The major street traffic includes all movements (left, through, and right)
(4) The minor street traffic includes left, through, and half of right-turn volumes from the minor street

Source: LSC Transportation Consultants, Inc.

Table 5
Intersection #8 - Erie Parkway/Future Access/Minor North-South Collector
2035 Signal Warrant Analysis
North Westerly
Erie, CO
LSC #221032; April, 2025

	Traffic Volume (vph)[2]			Warrant Analysis[1]										
				Warrant 1: Eight Hour Vehicular Volume Evaluation								Warrant 2: Four Hour Vehicular Volume Evaluation		
				Warrant Thresholds				Warrant Threshold Met?						
				Condition A (70%)		Condition B (70%)		NB Leg		SB Leg		70% Warrant Threshold	Warrant Threshold Met?	
	Major[3]	Minor 1[4] NB	Minor 2[4] SB	Major	Minor	Major	Minor	A	B	A	B	Minor Minimum	NB	SB
2035 Total Traffic														
12-1 AM	155	0	2	420	140	630	70	No	No	No	No	Low Vol	No	No
1-2 AM	107	0	2	420	140	630	70	No	No	No	No	Low Vol	No	No
2-3 AM	122	0	1	420	140	630	70	No	No	No	No	Low Vol	No	No
3-4 AM	145	0	2	420	140	630	70	No	No	No	No	Low Vol	No	No
4-5 AM	285	0	10	420	140	630	70	No	No	No	No	Low Vol	No	No
5-6 AM	689	0	26	420	140	630	70	No	No	No	No	144	No	No
6-7 AM	1131	0	74	420	140	630	70	No	No	No	Yes	80	No	No
7-8 AM	1782	0	125	420	140	630	70	No	No	No	Yes	80	No	Yes
8-9 AM	2710	0	107	420	140	630	70	No	No	No	Yes	80	No	Yes
9-10 AM	1651	0	72	420	140	630	70	No	No	No	Yes	80	No	No
10-11 AM	1532	0	71	420	140	630	70	No	No	No	Yes	80	No	No
11-12 PM	1521	0	64	420	140	630	70	No	No	No	No	80	No	No
12-1 PM	1094	0	211	420	140	630	70	No	No	Yes	Yes	82	No	Yes
1-2 PM	1059	0	223	420	140	630	70	No	No	Yes	Yes	96	No	Yes
2-3 PM	1114	0	227	420	140	630	70	No	No	Yes	Yes	80	No	Yes
3-4 PM	1499	0	231	420	140	630	70	No	No	Yes	Yes	80	No	Yes
4-5 PM	2040	0	274	420	140	630	70	No	No	Yes	Yes	80	No	Yes
5-6 PM	2812	0	271	420	140	630	70	No	No	Yes	Yes	80	No	Yes
6-7 PM	3124	0	217	420	140	630	70	No	No	Yes	Yes	80	No	Yes
7-8 PM	1569	0	157	420	140	630	70	No	No	Yes	Yes	80	No	Yes
8-9 PM	836	0	114	420	140	630	70	No	No	No	Yes	96	No	Yes
9-10 PM	490	0	85	420	140	630	70	No	No	No	No	232	No	No
10-11 PM	316	0	37	420	140	630	70	No	No	No	No	345	No	No
11-12 AM	228	0	24	420	140	630	70	No	No	No	No	Low Vol	No	No
				Numbers of hours the thresholds are are met				**0**	**0**	**8**	**14**		**0**	**11**
							Warrant met?	**Yes**					**Yes**	

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) Off peak hour traffic volumes are estimates by LSC based on 24-hour machine counts conducted by LSC on Erie Parkway in October 2024 and ITE Vehicle Time of Day Distribution Data
(3) The major street traffic includes all movements (left, through, and right)
(4) The minor street traffic includes left, through, and half of right-turn volumes from the minor street

Source: LSC Transportation Consultants, Inc.

Table 6a
Intersection #13 - CR 7/Flora View Drive
2035 Signal Warrant Analysis
North Westerly
Erie, CO
LSC #221032; April, 2025

Warrant Analysis[1]

	Traffic Volume (vph)[2]			Warrant 1: Eight Hour Vehicular Volume Evaluation								Warrant 2: Four Hour Vehicular Volume Evaluation		
				Warrant Thresholds				Warrant Threshold Met?						
				Condition A (70%)		Condition B (70%)		Minor 1 Leg		Minor 2 Leg		70% Warrant Threshold Minor Minimum	Warrant Threshold Met?	
	Major[3]	Minor 1[4] EB	Minor 2[4] WB	Major	Minor	Major	Minor	A	B	A	B		EB	WB
2035 Total Traffic														
12-1 AM	47	83	0	420	140	630	70	No	No	No	No	Low Vol	No	No
1-2 AM	31	2	0	420	140	630	70	No	No	No	No	Low Vol	No	No
2-3 AM	13	2	0	420	140	630	70	No	No	No	No	Low Vol	No	No
3-4 AM	21	0	0	420	140	630	70	No	No	No	No	Low Vol	No	No
4-5 AM	31	2	0	420	140	630	70	No	No	No	No	Low Vol	No	No
5-6 AM	79	7	0	420	140	630	70	No	No	No	No	Low Vol	No	No
6-7 AM	190	17	0	420	140	630	70	No	No	No	No	Low Vol	No	No
7-8 AM	383	49	0	420	140	630	70	No	No	No	No	301	No	No
8-9 AM	715	83	0	420	140	630	70	No	Yes	No	No	135	No	No
9-10 AM	439	71	0	420	140	630	70	No	No	No	No	265	No	No
10-11 AM	467	48	0	420	140	630	70	No	No	No	No	246	No	No
11-12 PM	502	46	0	420	140	630	70	No	No	No	No	224	No	No
12-1 PM	403	76	0	420	140	630	70	No	No	No	No	288	No	No
1-2 PM	438	59	0	420	140	630	70	No	No	No	No	265	No	No
2-3 PM	497	62	0	420	140	630	70	No	No	No	No	227	No	No
3-4 PM	656	63	0	420	140	630	70	No	No	No	No	155	No	No
4-5 PM	770	65	0	420	140	630	70	No	No	No	No	116	No	No
5-6 PM	989	76	0	420	140	630	70	No	Yes	No	No	116	No	No
6-7 PM	1028	75	0	420	140	630	70	No	Yes	No	No	109	No	No
7-8 PM	589	61	0	420	140	630	70	No	No	No	No	181	No	No
8-9 PM	357	44	0	420	140	630	70	No	No	No	No	318	No	No
9-10 PM	195	32	0	420	140	630	70	No	No	No	No	Low Vol	No	No
10-11 PM	97	24	0	420	140	630	70	No	No	No	No	Low Vol	No	No
11-12 AM	66	11	0	420	140	630	70	No	No	No	No	Low Vol	No	No
				Numbers of hours the thresholds are are met				**0**	**3**	**0**	**0**		**0**	**0**
							Warrant met?	**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) Off peak hour traffic volumes are estimates by LSC based on 24-hour machine counts conducted by LSC on CR 10 and CR 7 in October 2024
(3) The major street traffic includes all movements (left, through, and right)
(4) The minor street traffic includes left, through, and half of right-turn volumes from the minor street

Source: LSC Transportation Consultants, Inc.

Table 6b
Intersection #13 - CR 7/Flora View Drive
2045 Signal Warrant Analysis
North Westerly
Erie, CO
LSC #221032; April, 2025

Warrant Analysis[1]

	Traffic Volume (vph)[2]			Warrant 1: Eight Hour Vehicular Volume Evaluation								Warrant 2: Four Hour Vehicular Volume Evaluation		
				Warrant Thresholds				Warrant Threshold Met?						
				Condition A (70%)		Condition B (70%)		Minor 1 Leg		Minor 2 Leg		70% Warrant Threshold Minor Minimum	Warrant Threshold Met?	
	Major[3]	Minor 1[4] EB	Minor 2[4] WB	Major	Minor	Major	Minor	A	B	A	B		EB	WB
2045 Background Traffic														
12-1 AM	51	75	36	420	140	630	70	No	No	No	No	Low Vol	No	No
1-2 AM	32	7	27	420	140	630	70	No	No	No	No	Low Vol	No	No
2-3 AM	11	5	33	420	140	630	70	No	No	No	No	Low Vol	No	No
3-4 AM	19	4	27	420	140	630	70	No	No	No	No	Low Vol	No	No
4-5 AM	28	4	36	420	140	630	70	No	No	No	No	Low Vol	No	No
5-6 AM	94	5	72	420	140	630	70	No	No	No	No	Low Vol	No	No
6-7 AM	222	13	108	420	140	630	70	No	No	No	No	Low Vol	No	No
7-8 AM	460	22	254	420	140	630	70	No	No	Yes	No	251	No	Yes
8-9 AM	897	36	409	420	140	630	70	No	No	Yes	Yes	81	No	Yes
9-10 AM	490	75	337	420	140	630	70	No	No	Yes	No	232	No	Yes
10-11 AM	506	53	419	420	140	630	70	No	No	Yes	No	222	No	Yes
11-12 PM	521	33	151	420	140	630	70	No	No	Yes	No	215	No	No
12-1 PM	556	100	174	420	140	630	70	No	No	Yes	No	197	No	No
1-2 PM	608	48	228	420	140	630	70	No	No	Yes	No	172	No	Yes
2-3 PM	689	54	216	420	140	630	70	No	No	Yes	Yes	144	No	Yes
3-4 PM	933	54	257	420	140	630	70	No	No	Yes	Yes	93	No	Yes
4-5 PM	1079	52	317	420	140	630	70	No	No	Yes	Yes	88	No	Yes
5-6 PM	1430	63	437	420	140	630	70	No	No	Yes	Yes	80	No	Yes
6-7 PM	1522	102	532	420	140	630	70	No	Yes	Yes	Yes	80	Yes	Yes
7-8 PM	840	100	210	420	140	630	70	No	Yes	Yes	Yes	95	Yes	Yes
8-9 PM	461	36	138	420	140	630	70	No	No	No	No	250	No	No
9-10 PM	230	28	102	420	140	630	70	No	No	No	No	Low Vol	No	No
10-11 PM	121	21	67	420	140	630	70	No	No	No	No	Low Vol	No	No
11-12 AM	83	15	61	420	140	630	70	No	No	No	No	Low Vol	No	No
				Numbers of hours the thresholds are are met				**0**	**2**	**13**	**7**		**2**	**11**
							Warrant met?	**Yes**					**Yes**	
2045 Total Traffic														
12-1 AM	58	158	36	420	140	630	70	No	No	No	No	Low Vol	No	No
1-2 AM	36	9	27	420	140	630	70	No	No	No	No	Low Vol	No	No
2-3 AM	15	7	33	420	140	630	70	No	No	No	No	Low Vol	No	No
3-4 AM	22	4	27	420	140	630	70	No	No	No	No	Low Vol	No	No
4-5 AM	33	6	36	420	140	630	70	No	No	No	No	Low Vol	No	No
5-6 AM	100	12	72	420	140	630	70	No	No	No	No	Low Vol	No	No
6-7 AM	245	30	108	420	140	630	70	No	No	No	No	Low Vol	No	No
7-8 AM	505	71	254	420	140	630	70	No	No	Yes	No	223	No	Yes
8-9 AM	952	119	409	420	140	630	70	No	Yes	Yes	Yes	101	Yes	Yes
9-10 AM	540	146	337	420	140	630	70	Yes	No	Yes	No	205	No	Yes
10-11 AM	568	101	419	420	140	630	70	No	No	Yes	No	191	No	Yes
11-12 PM	600	79	151	420	140	630	70	No	No	Yes	No	175	No	No
12-1 PM	619	176	174	420	140	630	70	Yes	No	Yes	No	168	Yes	Yes
1-2 PM	676	107	228	420	140	630	70	No	Yes	Yes	Yes	148	No	Yes
2-3 PM	768	116	216	420	140	630	70	No	Yes	Yes	Yes	116	No	Yes
3-4 PM	1030	117	257	420	140	630	70	No	Yes	Yes	Yes	108	Yes	Yes
4-5 PM	1196	117	317	420	140	630	70	No	Yes	Yes	Yes	80	Yes	Yes
5-6 PM	1542	139	437	420	140	630	70	No	Yes	Yes	Yes	80	Yes	Yes
6-7 PM	1617	177	532	420	140	630	70	Yes	Yes	Yes	Yes	80	Yes	Yes
7-8 PM	907	161	210	420	140	630	70	Yes	Yes	Yes	Yes	83	Yes	Yes
8-9 PM	529	80	138	420	140	630	70	No	No	No	No	211	No	No
9-10 PM	279	60	102	420	140	630	70	No	No	No	No	Low Vol	No	No
10-11 PM	144	45	67	420	140	630	70	No	No	No	No	Low Vol	No	No
11-12 AM	98	26	61	420	140	630	70	No	No	No	No	Low Vol	No	No
				Numbers of hours the thresholds are are met				**4**	**8**	**13**	**8**		**7**	**12**
							Warrant met?	**Yes**					**Yes**	

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) Off peak hour traffic volumes are estimates by LSC based on 24-hour machine counts conducted by LSC on CR 10 and CR 7 in October 2024
(3) The major street traffic includes all movements (left, through, and right)
(4) The minor street traffic includes left, through, and half of right-turn volumes from the minor street

Source: LSC Transportation Consultants, Inc.

Table 7
Traffic Signal Warrant Summary
North Westerly
Aurora, CO
LSC #221032 April, 2025

Intersection No. & Location	Individual Table Number	Scenario Where Traffic Signal Warrant Is Projected To Be Met: Warrant 1 Eight-Hour Vehicular Volume	Scenario Where Traffic Signal Warrant Is Projected To Be Met: Warrant 2 Four-Hour Vehicular Volume
4) CR 7/CR 10	Tables 3a & 3b	Approaching by 2045	2045 Total
7) Erie Parkway/Waterford Street/ Major North-South Collector	Table 4	2035 Background	2035 Background
8) Erie Parkway/ Minor North-South Collector/ Future Access	Table 5	2035 Total	2035 Total
13) CR 7/Flora View Drive	Tables 6a & 6b	2045 Background	2045 Background

Table 8 (Page 1 of 4)
95th Percentile Queue Lengths and Recommended Improvements
North Westerly
Erie, CO
LSC #221032; April, 2025

Intersection No. & Location	Classification	Existing Lane Lengths (feet)	Proposed Lane Lengths[1] (feet)	Taper (feet)	95th Percentile Queue Length 2045 Total AM Peak (feet)	95th Percentile Queue Length 2045 Total PM Peak (feet)
1) CR 5/CR 10						
EB Approach	Minor Arterial	- - -	Construct as modern one-lane roundabout		75	75
WB Left	Minor Arterial	- - -			75	50
NB Approach	Minor Arterial	- - -			125	325
SB Approach	Minor Arterial	- - -			100	300
2) CR 10/Three-Quarter Movement Site Access						
EB Through/Right	Minor Arterial	- - -	- - -	- - -	<25	<25
WB Left		- - -	140	144	<25	<25
NB Right	Local	- - -	- - -	- - -	<25	<25
3) CR 10/Major North-South Collector						
EB Through	Minor Arterial	- - -	- - -	- - -	<25	<25
EB Right		- - -	0	144	<25	<25
WB Left		- - -	140	144	<25	<25
NB Left	Major Collector	- - -	100	120	<25	<25
NB Right		- - -	- - -	- - -	<25	<25
4) CR 7/CR 10						
EB Left	Minor Arterial	- - -	140	144	56	52
EB Through		- - -	- - -	- - -	98	107
EB Right		- - -	0	144	56	65
WB Left	Minor Arterial	- - -	200	144	36	51
WB Through/Right		- - -	- - -	- - -	154	139
NB Left	Principal Arterial	- - -	200	144	76	67
NB Through		- - -	- - -	- - -	74	104
NB Right		- - -	150	144	0	0
SB Left	Principal Arterial	- - -	175	144	20	22
SB Through		- - -	- - -	- - -	76	157
SB Right		- - -	150	144	0	0
5) CR 5/Erie Parkway						
EB Left	Principal Arterial	560	560	144	365	374
EB Through		- - -	- - -	- - -	307	763
EB Right		255	255	144	46	143
WB Left	Principal Arterial	500	500	144	94	113
WB Through		- - -	- - -	- - -	532	440
WB Right		500	500	144	64	137
NB Left	Minor Arterial	1 @ 380	2 @ 200	288	164	174
NB Through		- - -	- - -	144	173	228
NB Right		- - -	100	144	0	45
SB Left	Minor Arterial	1 @ 540	2 @ 275	288	270	222
SB Through		- - -	- - -	- - -	189	163
SB Right		220	275	144	271	66
6) Erie Parkway/Westerly Boulevard/ Northwesterly Right-in/Right-out						
EB Right	Principal Arterial	- - -	150	144	<25	<25
WB Left		110	200	144	<25	43
WB Right		- - -	150	144	<25	<25
NB Right	Major Collector	- - -	- - -	- - -	28	43
SB Right	Local	- - -	- - -	- - -	<25	<25

Table 8 (Page 2 of 4)
95th Percentile Queue Lengths and Recommended Improvements
North Westerly
Erie, CO
LSC #221032; April, 2025

Intersection No. & Location	Classification	Existing Lane Lengths (feet)	Proposed Lane Lengths[1] (feet)	Taper (feet)	95th Percentile Queue Length 2045 Total AM Peak (feet)	95th Percentile Queue Length 2045 Total PM Peak (feet)
7) Erie Parkway/Waterford Street/Major North-South Collector						
EB Left	Principal Arterial	- - -	250	144	32	209
EB Through		- - -	- - -	- - -	460	864
EB Right		- - -	150	144	38	37
WB Left	Principal Arterial	- - -	250	144	21	110
WB Through		- - -	- - -	- - -	496	547
WB Right		- - -	150	144	0	42
NB Left	Major Collector	- - -	250	120	213	120
NB Through/Right		- - -	- - -	- - -	94	23
SB Left	Major Collector	- - -	175	120	163	112
SB Through/Right		- - -	- - -	- - -	13	0
8) Erie Parkway/Future Access/Minor North-South Collector						
EB Left	Principal Arterial	- - -	280	144	37	278
EB Through		- - -	- - -	- - -	494	783
EB Right		- - -	150	144	0	49
WB Left	Principal Arterial	- - -	250	144	25	155
WB Through		- - -	- - -	- - -	422	631
WB Right		- - -	150	144	4	58
NB Left	Minor Collector	- - -	165	120	52	161
NB Through/Right		- - -	- - -	- - -	0	168
SB Left	Minor Collector	- - -	185	120	82	185
SB Through/Right		- - -	- - -	- - -	0	87
9) Erie Parkway/CR 7						
EB Left	Principal Arterial	400	400	144	100	266
EB Through		- - -	- - -	- - -	620	791
EB Right		300	300	144	4	36
WB Left	Principal Arterial	390	390	144	157	227
WB Through/Right		- - -	- - -	- - -	362	468
WB Right		- - -	150	144	40	65
NB Left	Principal Arterial	125	275	288	143	269
NB Through		- - -	- - -	- - -	109	213
NB Right		- - -	100	144	0	1
SB Left	Principal Arterial	130	2 @ 275	144	128	261
SB Through/Right		- - -	- - -	- - -	133	189
SB Right		- - -	175	144	67	167
10) CR 5/Three-Quarter Movement Site Access						
WB Right	Local	- - -	- - -	- - -	<25	<25
NB Through		- - -	- - -	- - -	<25	<25
NB Right	Minor Arterial	- - -	100	144	<25	<25
SB Left		- - -	125	144	<25	<25

Table 8 (Page 3 of 4)
95th Percentile Queue Lengths and Recommended Improvements
North Westerly
Erie, CO
LSC #221032; April, 2025

Intersection No. & Location	Classification	Existing Lane Lengths (feet)	Proposed Lane Lengths[1] (feet)	Taper (feet)	95th Percentile Queue Length 2045 Total AM Peak (feet)	95th Percentile Queue Length 2045 Total PM Peak (feet)
11) CR 5/Flora View Drive						
EB Left		95	95	120	26	21
EB Through	Major Collector	- - -	- - -	- - -	111	52
EB Right		115	115	120	56	27
WB Left		continuous	115	120	134	75
WB Through	Major Collector	- - -	- - -	- - -	71	56
WB Right		- - -	100	144	57	56
NB Left		245	245	144	56	57
NB Through		- - -	- - -	- - -	254	400
NB Right	Minor Arterial	245	245	144	32	5
SB Left		245	245	144	74	57
SB Through	Minor Arterial	- - -	- - -	- - -	359	345
SB Right		150	150	144	0	0
12) CR 7/CR 8.75						
EB Approach	Local	- - -	- - -	- - -	<25	<25
NB Left	Principal	- - -	100	144	<25	<25
SB Through/Right	Arterial	- - -	- - -	- - -	<25	<25
13) CR 7/Flora View Drive						
EB Left	Major Collector	- - -	100	120	66	60
EB Through/Right		- - -	- - -	- - -	118	136
WB Left	Major Collector	- - -	310	120	252	310
WB Right or Through/Right		- - -	- - -	- - -	193	203
NB Left	Principal Arterial	- - -	190	144	12	27
NB Through		- - -	- - -	- - -	101	150
NB Right		- - -	150	144	41	60
SB Left	Principal Arterial	- - -	200	144	24	57
SB Through		- - -	- - -	- - -	123	256
SB Right		- - -	150	144	0	0
15) CR 7/North Three-Quarter Movement Site Access						
EB Right	Local	- - -	- - -	- - -	<25	<25
NB Left	Principal Arterial	- - -	175	144	<25	<25
16) CR 7/South Three-Quarter Movement Site Access						
EB Right	Minor Collector	- - -	- - -	- - -	<25	<25
NB Left	Principal	- - -	190	144	<25	<25
SB Right	Arterial	- - -	150	144	25	<25
18) Flora View Drive/Major North-South Collector						
EB Left	Major Collector	- - -			<25	25
WB Left	Major Collector	- - -	Construct as modern		25	25
NB Left	Major Collector	- - -	one-lane roundabout		<25	25
SB Left	Major Collector	- - -			<25	<25

Note:
(1) The proposed/existing lane lengths are greater than the 95th percentile queue lengths excpet at intersection #21 which is restricted due to the vicinity of the school.

Table 8 (Page 4 of 4)
95th Percentile Queue Lengths and Recommended Improvements
North Westerly
Erie, CO
LSC #221032; April, 2025

Intersection No. & Location	Classification	Existing Lane Lengths (feet)	Proposed Lane Lengths[1] (feet)	Taper (feet)	95th Percentile Queue Length 2045 Total AM Peak (feet)	95th Percentile Queue Length 2045 Total PM Peak (feet)
19) Flora View Drive/Minor North-South Collector[2]						
EB Through/Right	Major Collector	- - -	- - -	- - -	<25	<25
WB Left		- - -	100	120	<25	<25
WB Through/Right		- - -	- - -	- - -	<25	<25
NB Left	Minor Collector	- - -	100	120	<25	<25
NB Right		- - -	- - -	- - -	<25	<25
20) CR 5/North High School Access						
WB Approach	Local	- - -	- - -	- - -	<25	45
SB Left	Minor Arterial	250	250	120	<25	<25
21) WCR 5/Colliers Parkway/Erie High School[1]						
EB Left	Major Collector	200	200		150	53
EB Through		--	--		126	14
EB Right		200	200		123	56
WB Left	Local	125	125		168	70
WB Through/Right		125	125		115	42
NB Left	Minor Arterial	125	125		64	68
NB Through		--	--		160	204
NB Right		Continuous	Continuous		14	0
SB Left	Minor Arterial	250	250		91	20
SB Through		--	--		266	173
SB Right		250	250		0	0
22) CR 5/South High School Access						
EB Right	Local	- - -	- - -	- - -	<25	<25
WB Right	Local	- - -	- - -	- - -	30	30
SB Left	Minor Arterial	125	125	120	33	<25
23) Major North-South Collector/East-West Local						
WB Approach	Major Collector	- - -	100	120	<25	<25
SB Left		- - -	- - -	- - -	<25	<25
24) Major North-South Collector/East-West Local						
NB Approach	Minor Collector	- - -	- - -	- - -	<25	73
EB Approach	Minor Collector	- - -	- - -	- - -	<25	<25
WB Approach	Local	- - -	- - -	- - -	<25	<25
SB Approach	Local	- - -	- - -	- - -	<25	48

Note:
(1) The proposed/existing lane lengths are greater than the 95th percentile queue lengths excpet at intersection #21 which is restricted due to the vicinity of the school.

Table 9 (Page 1 of 2)
Recommended Improvements
North Westerly
Erie, CO
LSC #221032; April, 2025

Inter-section No.	Intersection Location	Recommended Improvements by 2045 [1]	Scenario Recommended
1	CR 5/CR 10	Reconstruct as modern one-lane roundabout	2035 Background
2	CR 10/ Three-Quarter Movement Site Access	WB LT - construct lane - 1 @ 140 feet plus 144-foot transition taper	2035 Total
3	CR 10/Major North-South Collector	EB RT - construct lane - 1 @ 100 feet plus 144-foot transition taper	2035 Total
		WB LT - construct lane - 1 @ 140 feet plus 144-foot transition taper	2035 Total
		NB LT - construct lane - 1 @ 100 feet plus 120-foot transition taper	2035 Total
4	CR 7/CR 10	EB LT - construct lane - 1 @ 140 feet plus 144-foot transition taper	2035 Total
		EB RT - construct lane - 1 @ 100 feet plus 144-foot transition taper	2045 Background
		WB LT - construct lane - 1 @ 200 feet plus 144-foot transition taper	2035 Total
		NB LT - construct lane - 1 @ 200 feet plus 144-foot transition taper	2045 Background
		NB RT - construct lane - 1 @ 150 feet plus 144-foot transition taper	2035 Total
		SB LT - construct lane - 1 @ 175 feet plus 144-foot transition taper	2045 Background
		SB RT - construct lane - 1 @ 150 feet plus 144-foot transition taper	2035 Total
		Traffic signalization when warranted	2045 Total
5	CR 5/Erie Parkway	NB LT - construct 2nd lane - 2 @ 200 feet plus 288-foot transition taper	2045 Background
		NB RT - construct lane - 1 @ 100 feet plus 144-foot transition taper	2045 Background
		SB LT - construct 2nd lane - 2 @ 275 feet plus 288-foot transition taper	2045 Background
		SB RT - extend lane - 1 @ 275 feet plus 144-foot transition taper	2045 Background
6	Erie Parkway/Westerly Boulevard/ Northwesterly Right-in/Right-out	EB RT - construct lane - 1 @ 150 feet plus 144-foot transition taper	2035 Background
		WB LT - construct lane - 1 @ 200 feet plus 144-foot transition taper	2035 Total
		WB RT - construct lane - 1 @ 150 feet plus 144-foot transition taper	2035 Total
7	Erie Parkway/Waterford Street/ Major North/South Collector	EB LT - construct lane - 1 @ 250 feet plus 144-foot transition taper	2035 Total
		EB RT - construct lane - 1 @ 150 feet plus 144-foot transition taper	2035 Background
		WB LT - construct lane - 1 @ 250 feet plus 144-foot transition taper	2035 Background
		WB RT - construct lane - 1 @ 150 feet plus 144-foot transition taper	2035 Total
		NB LT - construct lane - 1 @ 250 feet plus 120-foot transition taper	2035 Background
		SB LT - construct lane - 1 @ 175 feet plus 120-foot transition taper	2035 Total
		Traffic signalization when warranted	2035 Background
8	Erie Parkway/Future Access/ Minor North-South Collector	EB LT - construct lane - 1 @ 280 feet plus 144-foot transition taper	2035 Total
		EB RT - construct lane - 1 @ 150 feet plus 144-foot transition taper	2045 Background
		WB LT - construct lane - 1 @ 250 feet plus 144-foot transition taper	2045 Background
		WB RT - construct lane - 1 @ 150 feet plus 144-foot transition taper	2035 Total
		NB LT - construct lane - 1 @ 165 feet plus 120-foot transition taper	2045 Background
		SB LT - construct lane - 1 @ 185 feet plus 120-foot transition taper	2035 Total
		Traffic signalization when warranted	2035 Total

(1) Turn lane lengths and tapers are based on the Town of Erie requirements

Table 9 (Page 2 of 2)
Recommended Improvements
North Westerly
Erie, CO
LSC #221032; April, 2025

Inter-section No.	Intersection Location	Recommended Improvements by 2045 [1]	Scenario Recommended
9	Erie Parkway/CR 7	WB RT - construct lane - 1 @ 150 feet plus 144-foot transition taper	2035 Total
		NB RT - construct lane - 1 @ 100 feet plus 144-foot transition taper	2035 Background
		SB LT - construct 2nd lane - 2 @ 275 feet plus 288-foot transition taper	2045 Background
		SB RT - construct lane - 1 @ 175 feet plus 144-foot transition taper	2035 Total
10	CR 5/ Three-Quarter Movement Site Access	NB RT - construct lane - 1 @ 100 feet plus 144-foot transition taper	2035 Total
		SB LT - construct lane - 1 @ 125 feet plus 144-foot transition taper	2035 Total
11	CR 5/Flora View Drive	WB RT - construct lane - 1 @ 100 feet plus 144-foot transition taper	2035 Total
12	CR 7/CR 8.75	NB LT - construct lane - 1 @ 100 feet plus 144-foot transition taper	2045 Background
13	CR 7/Flora View Drive	EB LT - construct lane - 1 @ 100 feet plus 120-foot transition taper	2035 Total
		WB LT - construct lane - 1 @ 310 feet plus 120-foot transition taper	2045 Background
		NB LT - construct lane - 1 @ 190 feet plus 144-foot transition taper	2035 Total
		NB RT - construct lane - 1 @ 150 feet plus 144-foot transition taper	2045 Background
		SB LT - construct lane - 1 @ 200 feet plus 144-foot transition taper	2045 Background
		SB RT - construct lane - 1 @ 150 feet plus 144-foot transition taper	2035 Total
		Traffic signalization when warranted	2045 Background
14	Access no longer proposed		
15	CR 7/North Three-Quarter Movement Site Access	NB LT - construct lane - 1 @ 175 feet plus 144-foot transition taper	2035 Total
16	CR 7/South Three-Quarter Movement Site Access	NB LT - construct lane - 1 @ 190 feet plus 144-foot transition taper	2035 Total
		SB RT - construct lane - 1 @ 150 feet plus 144-foot transition taper	2045 Background
17	Access no longer proposed		
18	Flora View Drive/ Major North-South Collector	Construct as one-lane modern roundabout	2035 Total
19	Flora View Drive/ Minor North-South Collector[2]	Option 1:	2035 Total
		NB LT - construct lane - 1 @ 100 feet plus 120-foot transition taper	2035 Total
		WB LT - construct lane - 1 @ 100 feet plus 120-foot transition taper	2035 Total
		Option 2: Construct as one-lane modern roundabout	2035 Total
20	CR 5/North High School Access	No improvements anticipated	
21	WCR 5/Colliers Parkway/ Erie High School	No improvements anticipated	
22	CR 5/South High School Access	No improvements anticipated - may need to further restrict WB LT over time	

(1) Turn lane lengths and tapers are based on the Town of Erie requirements
(2) Intersection control type to be determined with the Preliminary Plan

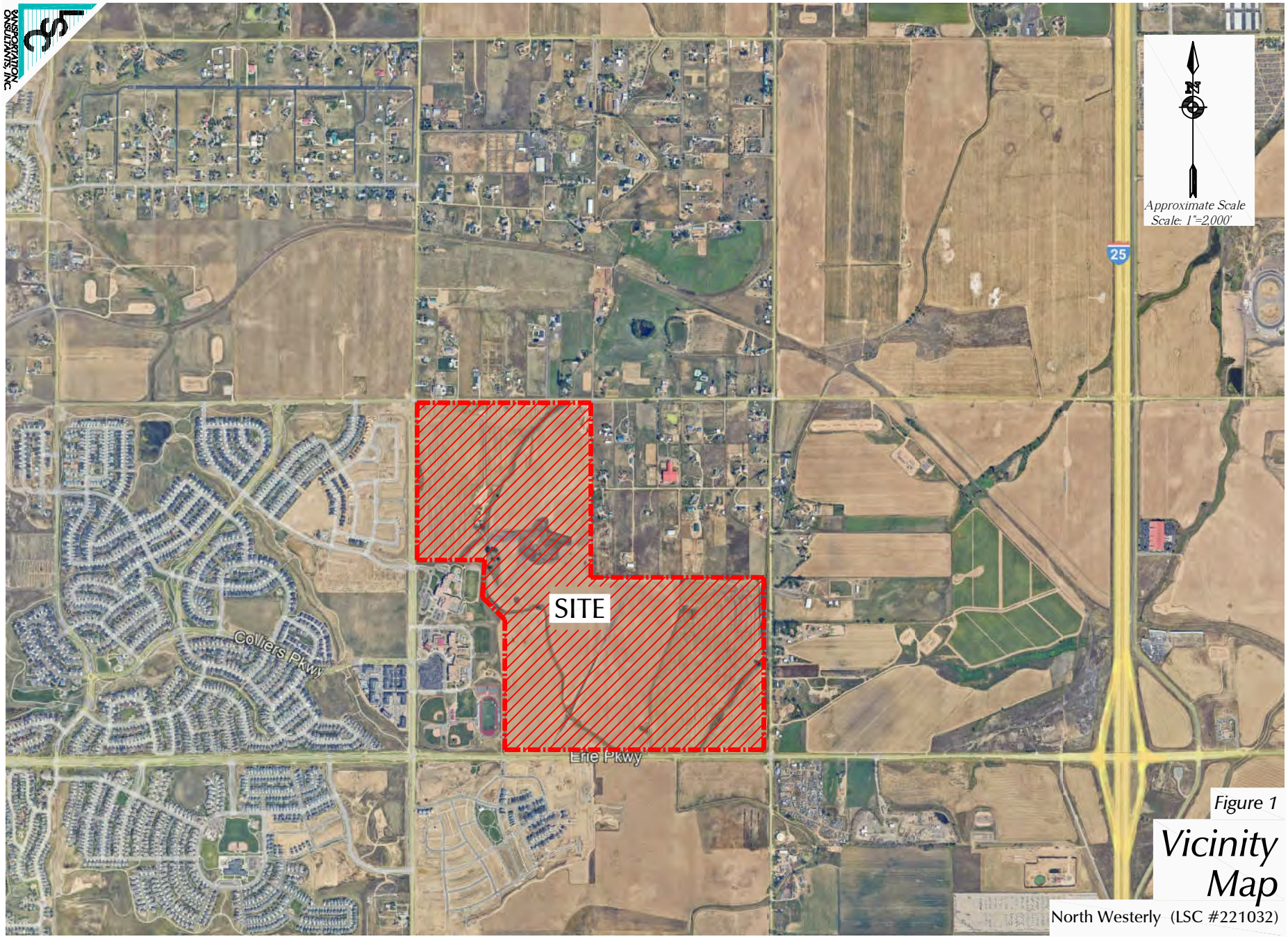
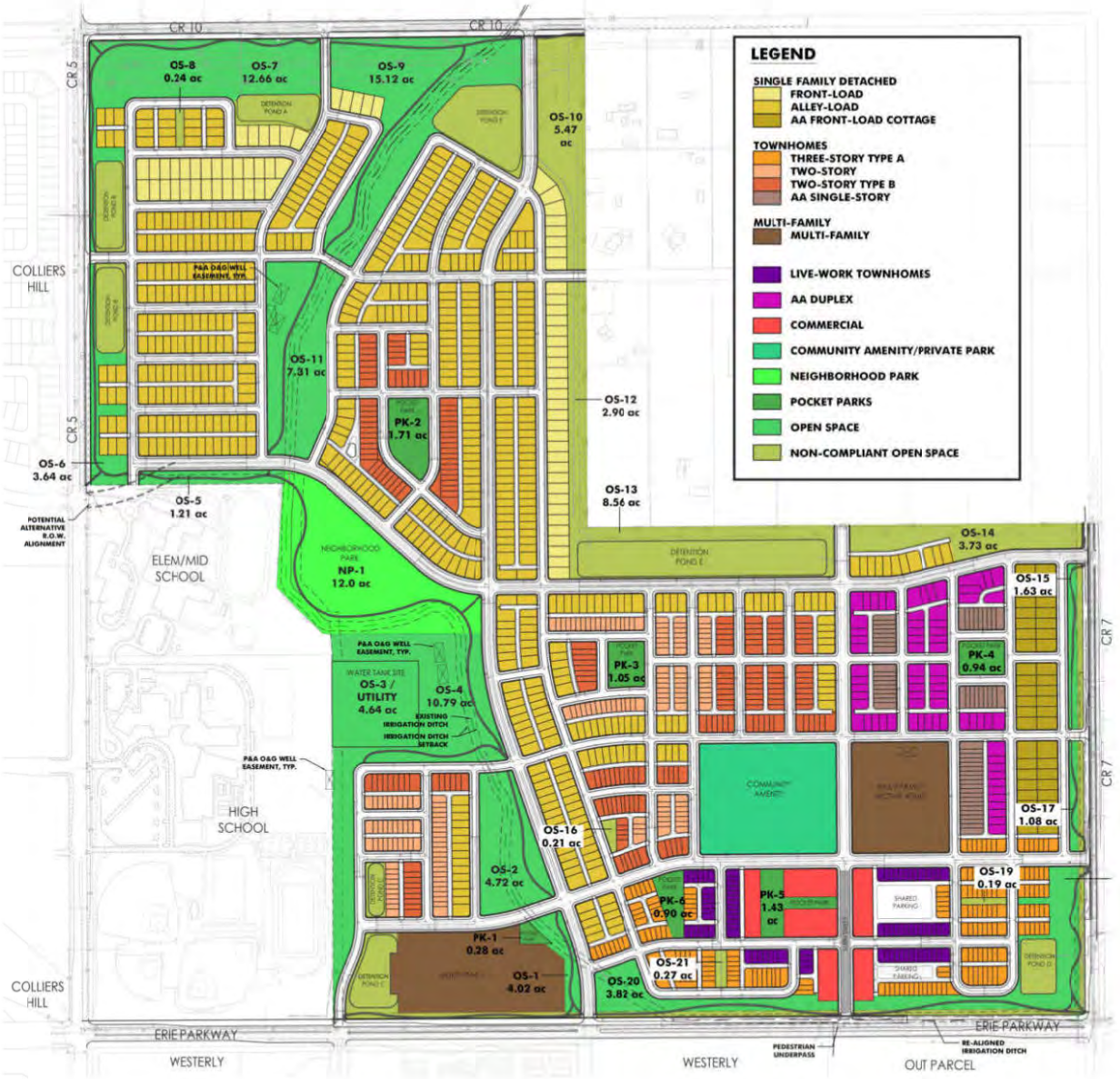


Figure 1

Vicinity Map

North Westerly (LSC #221032)



Approximate Scale
Scale: NTS

Figure 2a

Site Plan

North Westerly (LSC #221032)

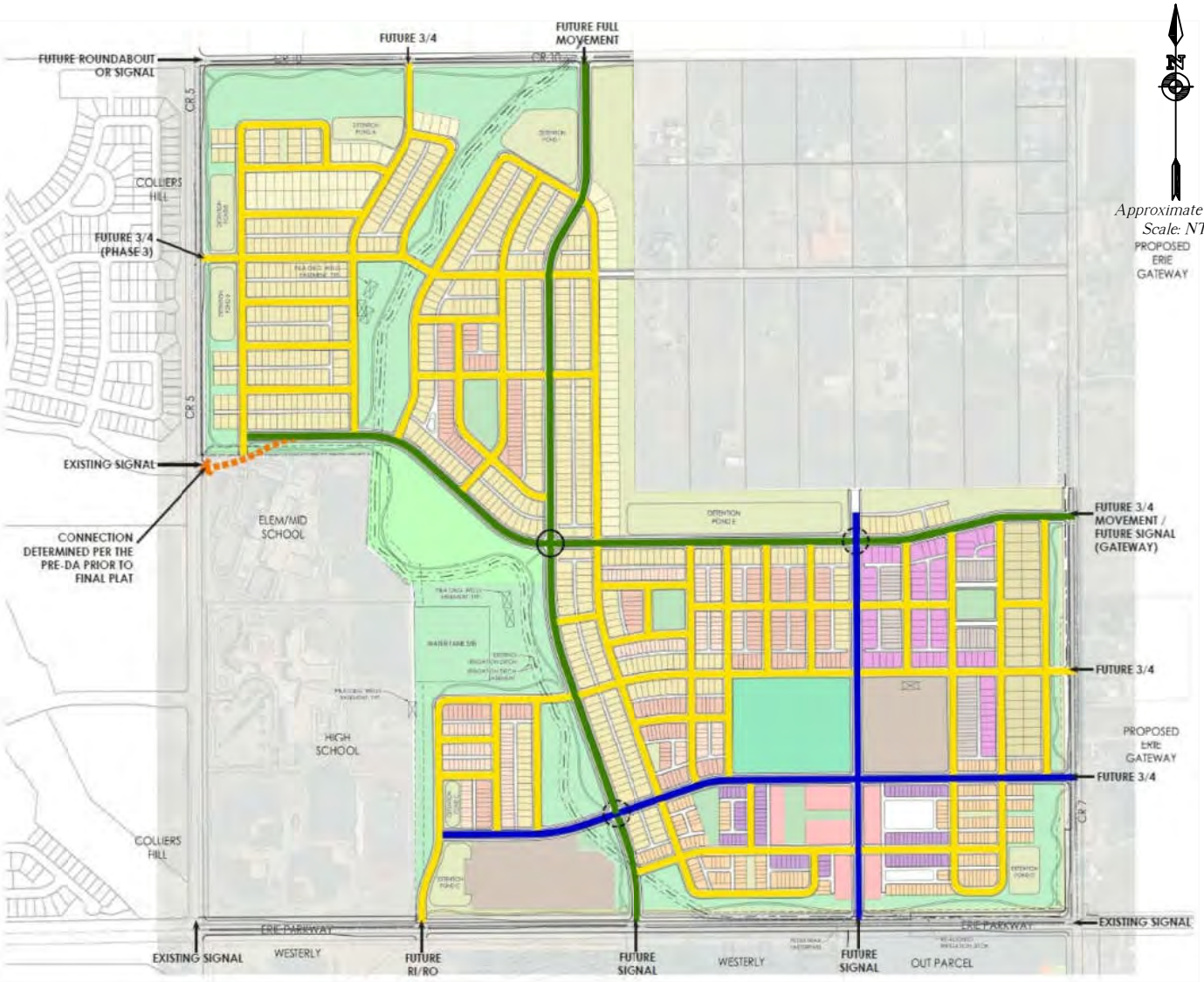
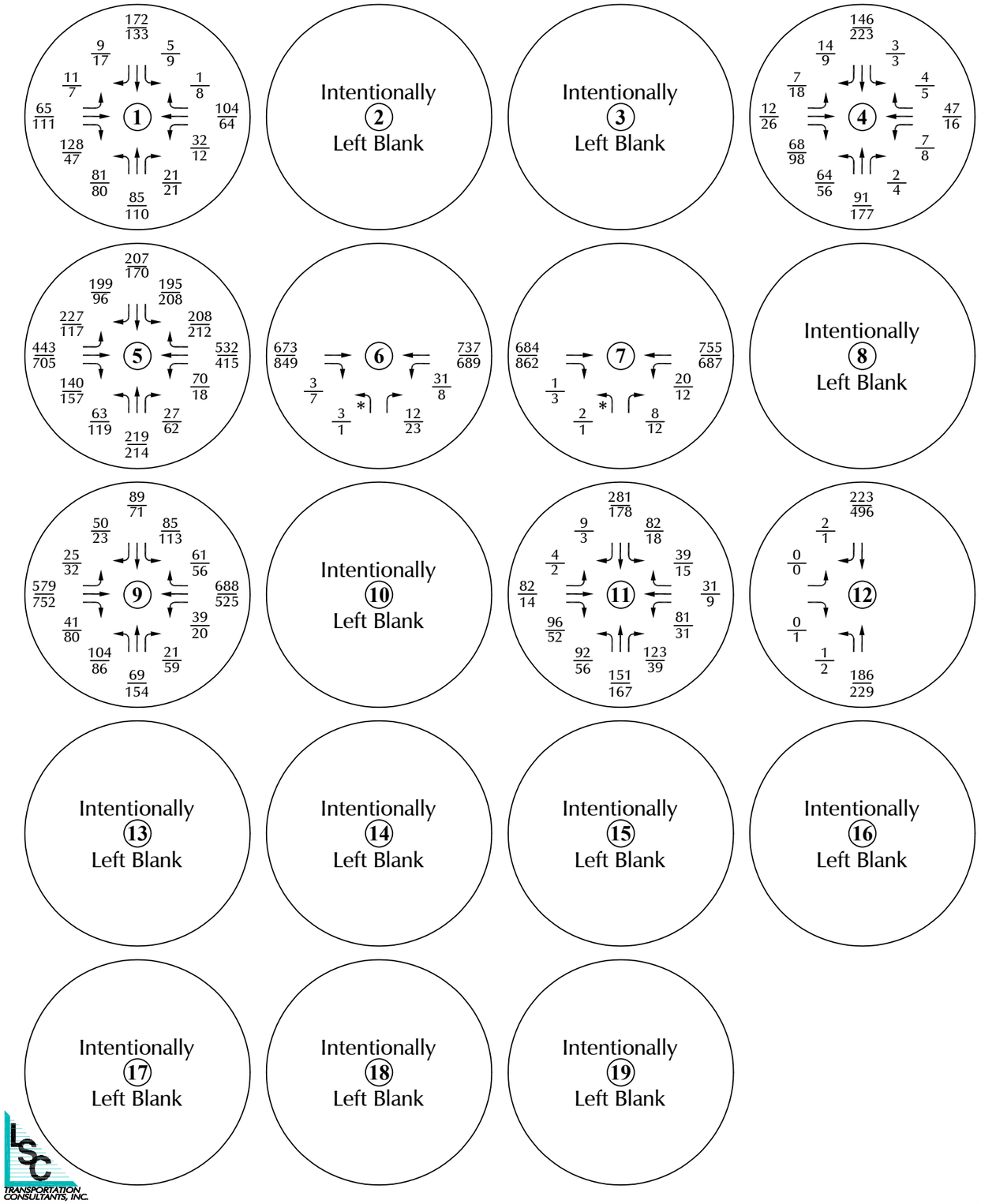


Figure 2b

Streetscape Plan

North Westerly (LSC #221032)



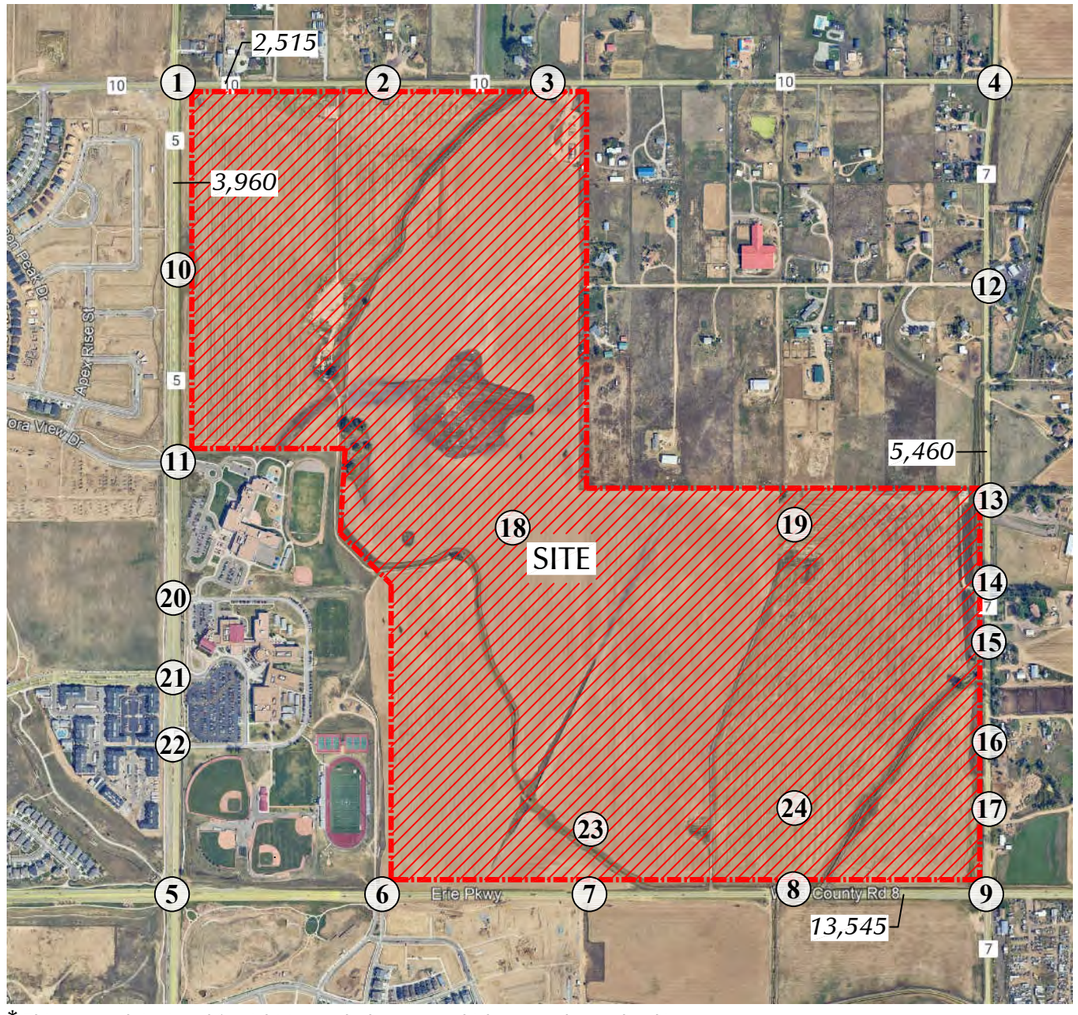
LEGEND:

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

1,000 = Average Daily Traffic

N

Approximate Scale
Scale: 1"=1,000'



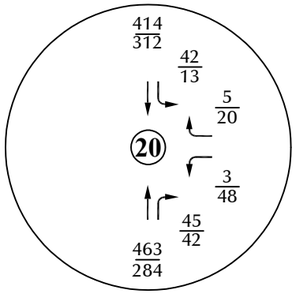
* This approach is signed for right-turn only, however, vehicles were observed making a northbound left-turn.

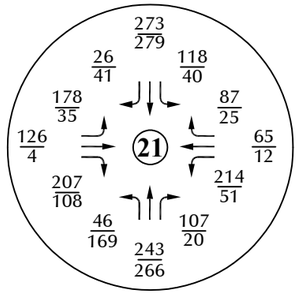
Figure 3a

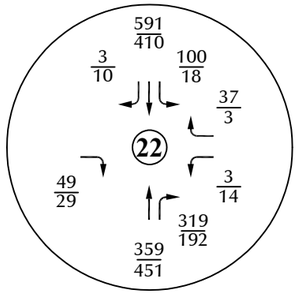
Existing Traffic

North Westerly (LSC #221032)

LSC TRANSPORTATION CONSULTANTS, INC.







Intentionally
23
Left Blank

Intentionally
24
Left Blank

LEGEND:

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

1,000 = Average Daily Traffic

Approximate Scale
Scale: 1"=1,000'

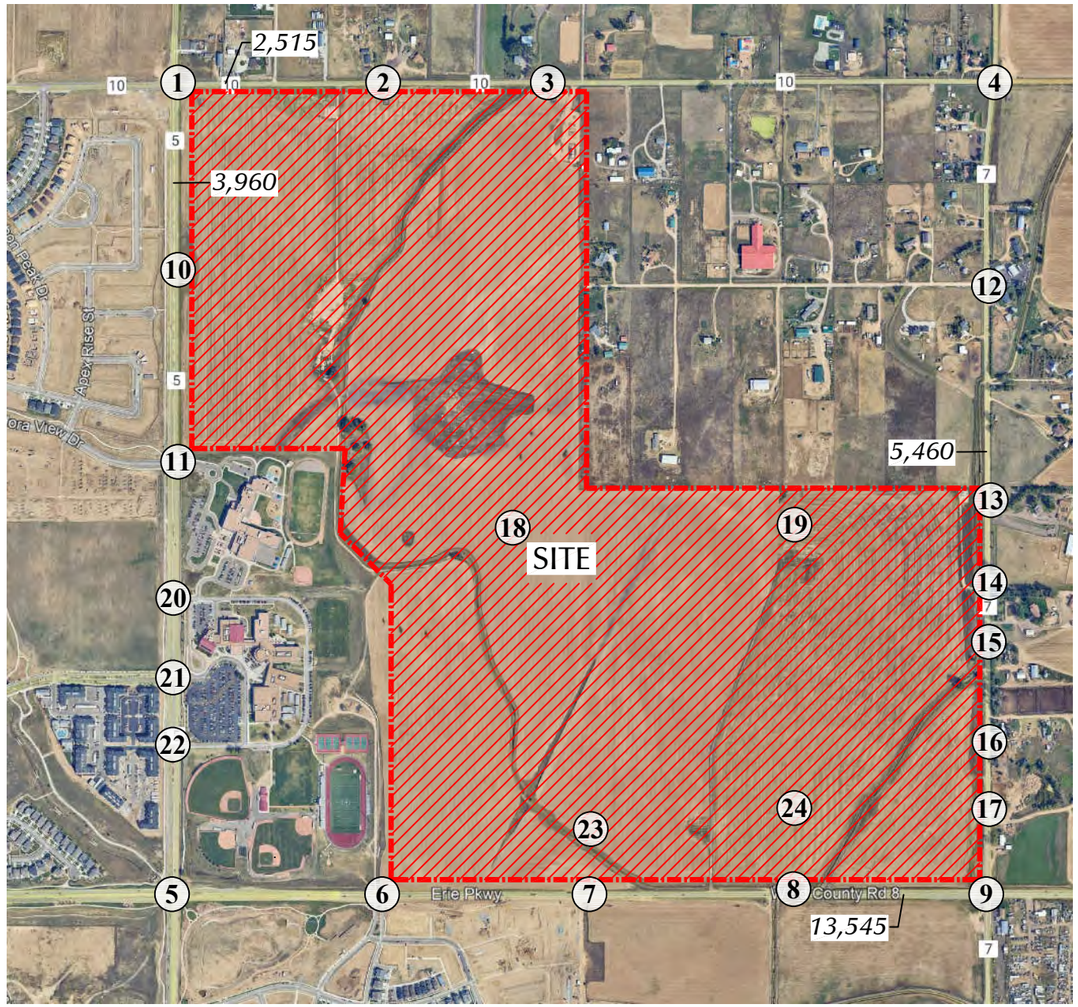
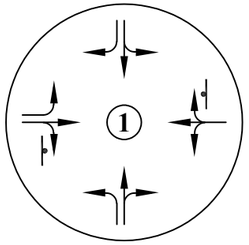


Figure 3b

Existing Traffic

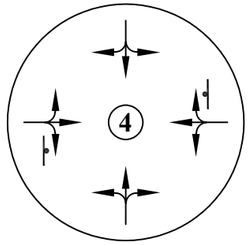
North Westerly (LSC #221032)

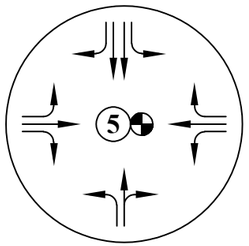
LSC TRANSPORTATION CONSULTANTS, INC.

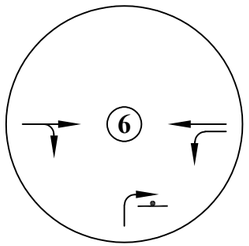


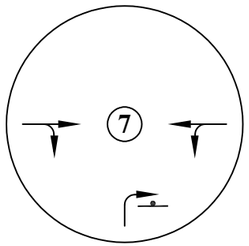
Intentionally
2
Left Blank

Intentionally
3
Left Blank

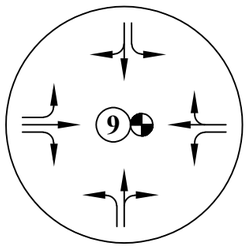




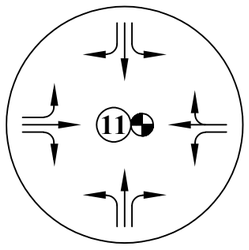


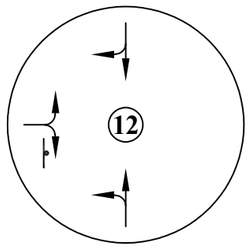


Intentionally
8
Left Blank



Intentionally
10
Left Blank





Intentionally
13
Left Blank

Intentionally
14
Left Blank

Intentionally
15
Left Blank

Intentionally
16
Left Blank

Intentionally
17
Left Blank

Intentionally
18
Left Blank

Intentionally
19
Left Blank

LEGEND:

= Stop Sign

= Traffic Signal

= Speed Limit

Approximate Scale
Scale: 1"=1,000'

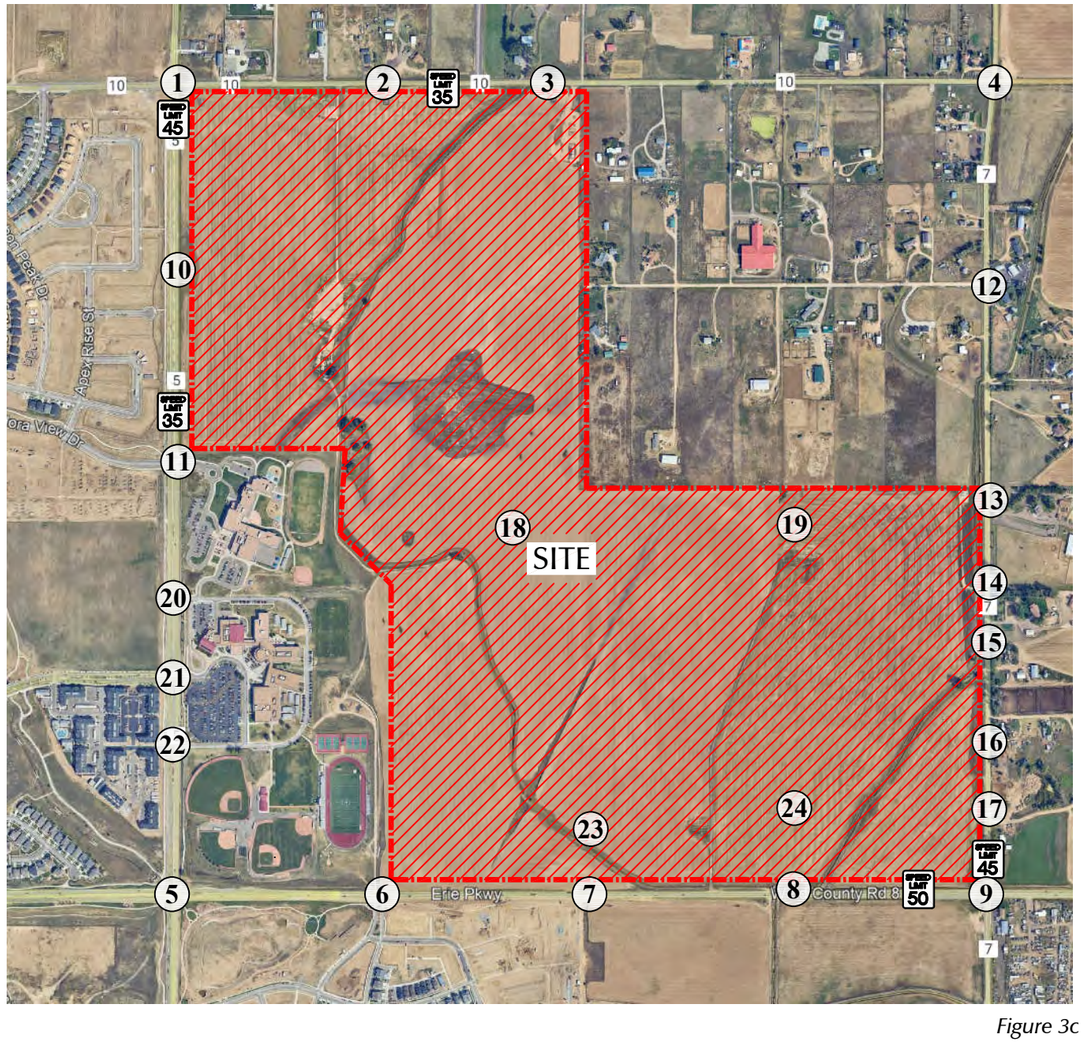
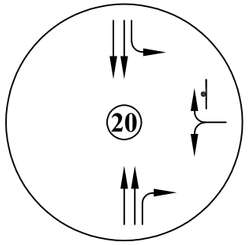


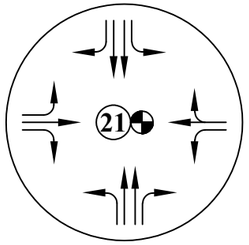
Figure 3c

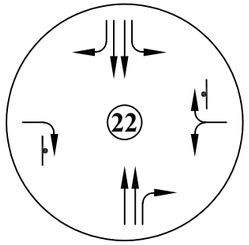
Existing Lane Geometry and Traffic Control

North Westerly (LSC #221032)

LSC TRANSPORTATION CONSULTANTS, INC.







Intentionally
23
Left Blank

Intentionally
24
Left Blank

LEGEND:

= Stop Sign

= Traffic Signal

= Speed Limit

Approximate Scale
Scale: 1"=1,000'

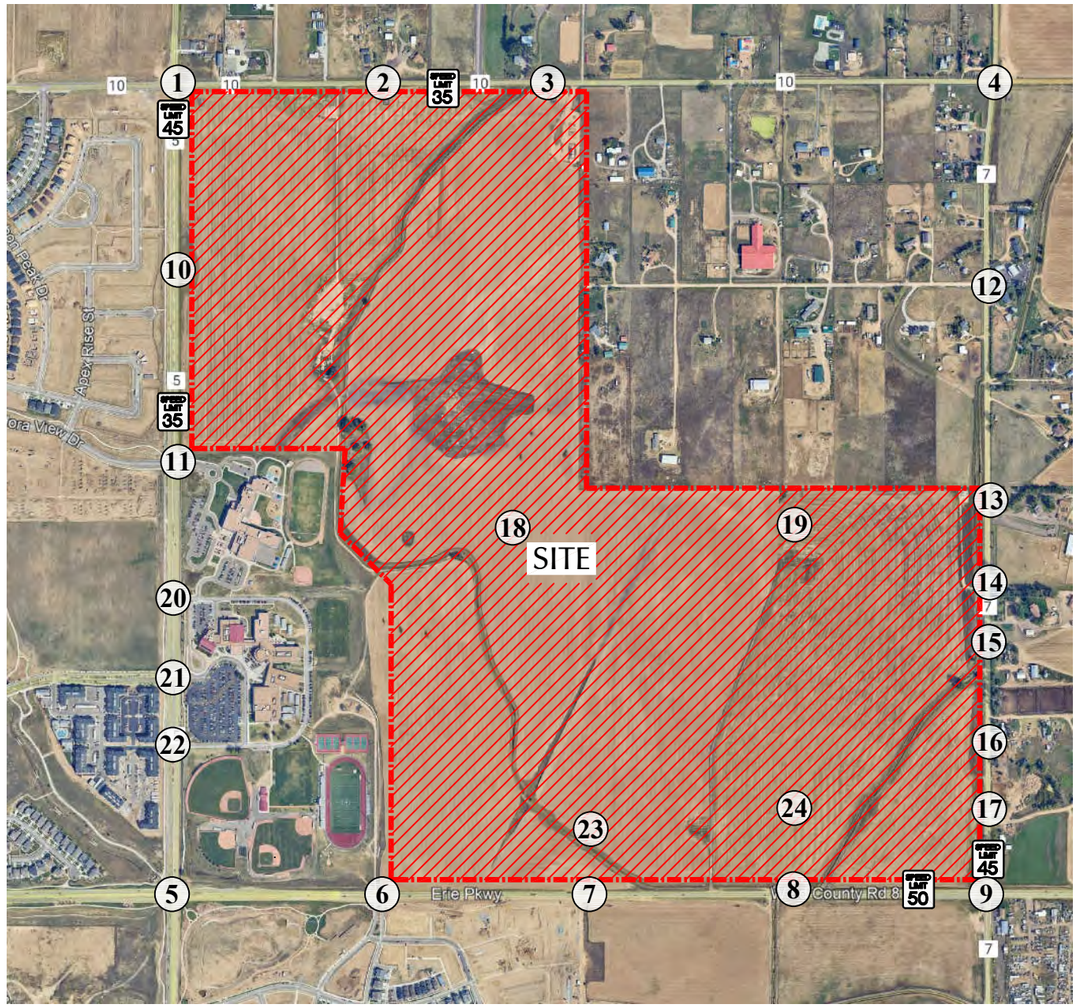
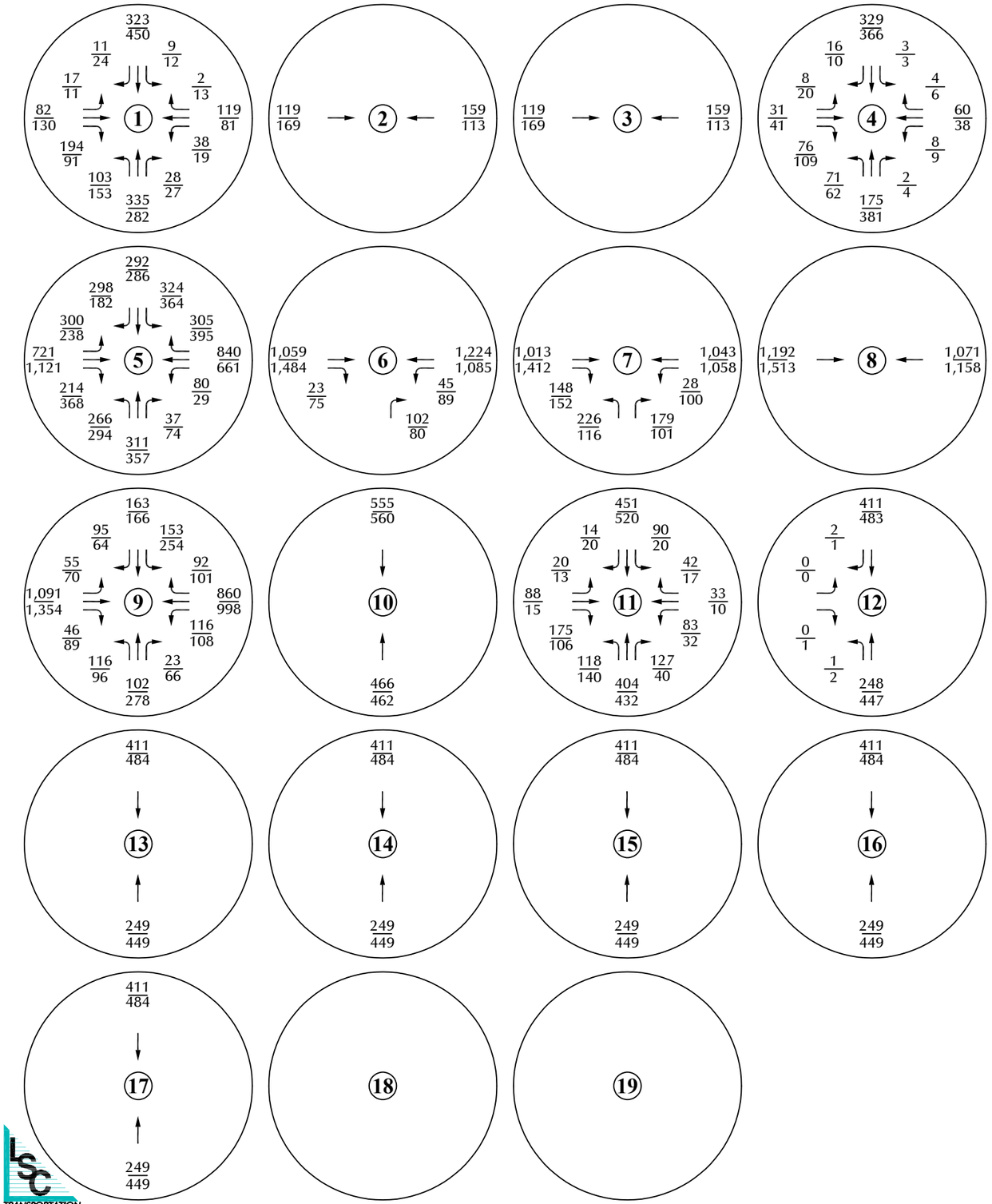


Figure 3d

Existing Lane Geometry and Traffic Control

North Westerly (LSC #221032)

LSC TRANSPORTATION CONSULTANTS, INC.



LEGEND:

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

1,000 = Average Daily Traffic

Approximate Scale
Scale: 1"=1,000'

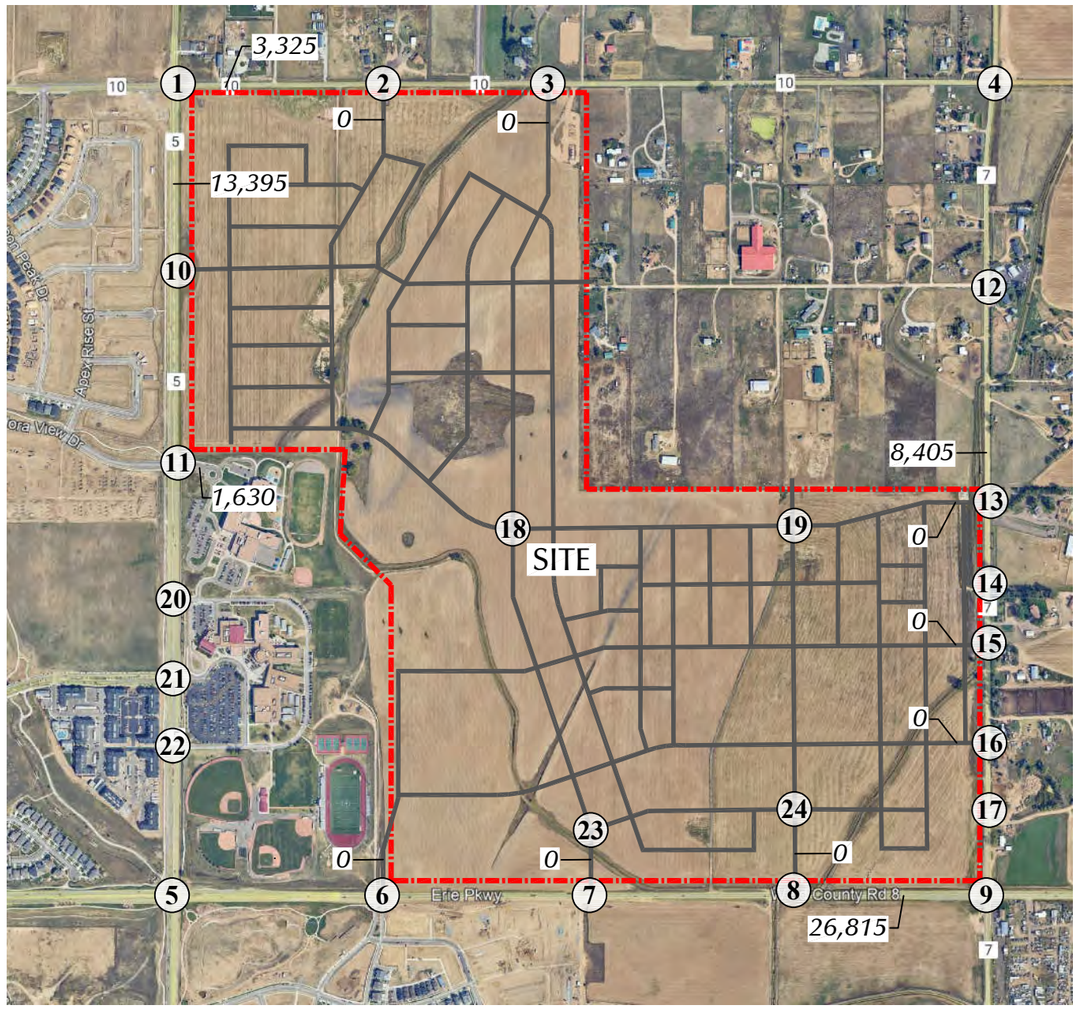
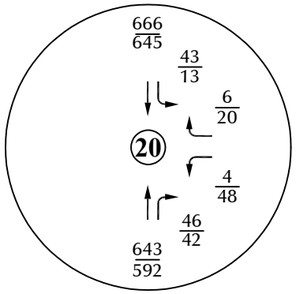


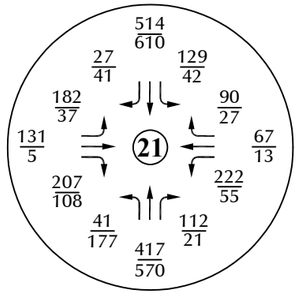
Figure 4a

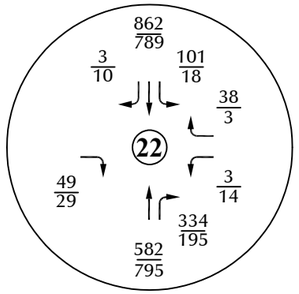
Year 2035 Background Traffic

North Westerly (LSC #221032)

TRANSPORTATION CONSULTANTS, INC.







Intentionally
23
Left Blank

Intentionally
24
Left Blank

LEGEND:

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

1,000 = Average Daily Traffic

N

Approximate Scale
Scale: 1"=1,000'

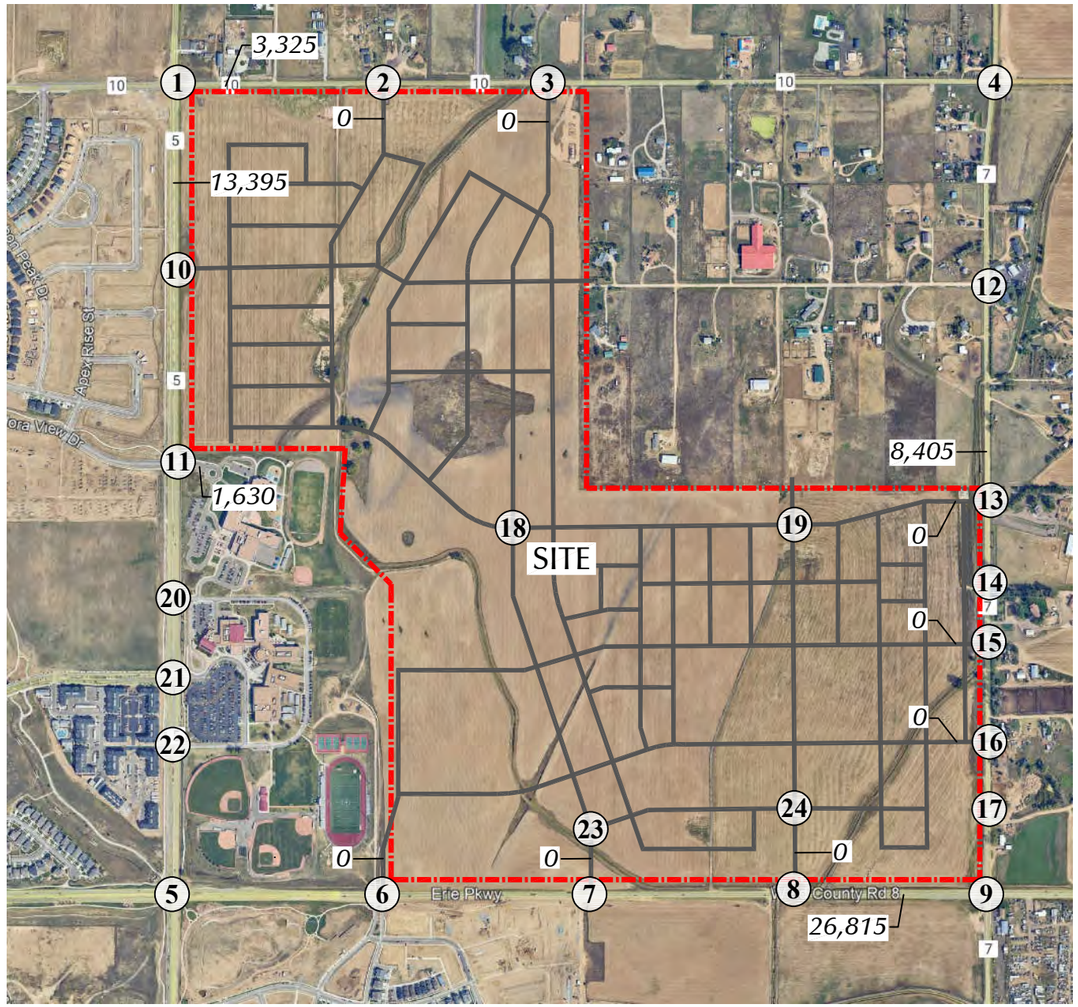
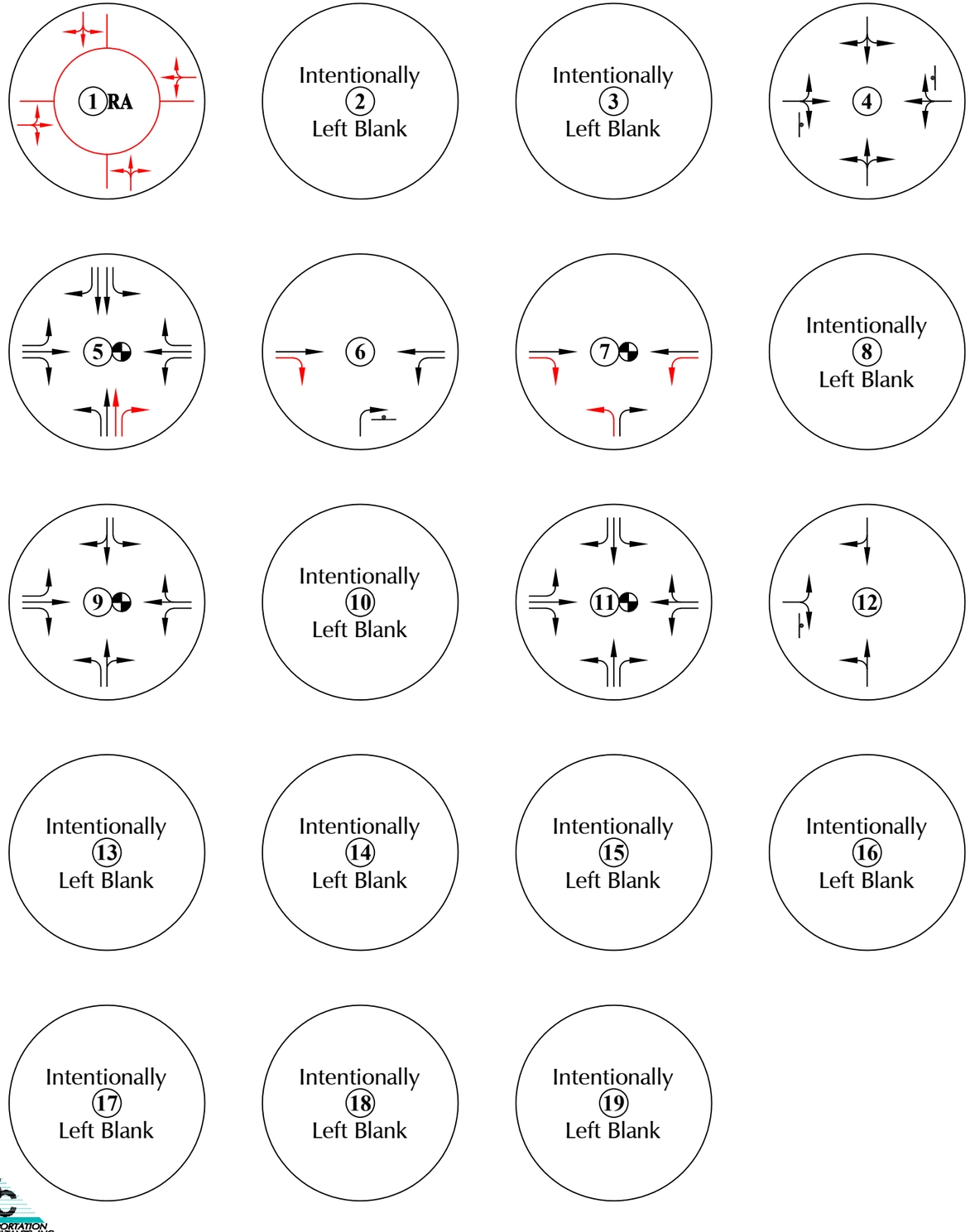


Figure 4b

Year 2035 Background Traffic

North Westerly (LSC #221032)

TRANSPORTATION CONSULTANTS, INC.



LEGEND:

= Stop Sign

= Traffic Signal

RA = Modern Roundabout

= Anticipated 2035 Background Improvements

N

Approximate Scale
Scale: 1"=1,000'

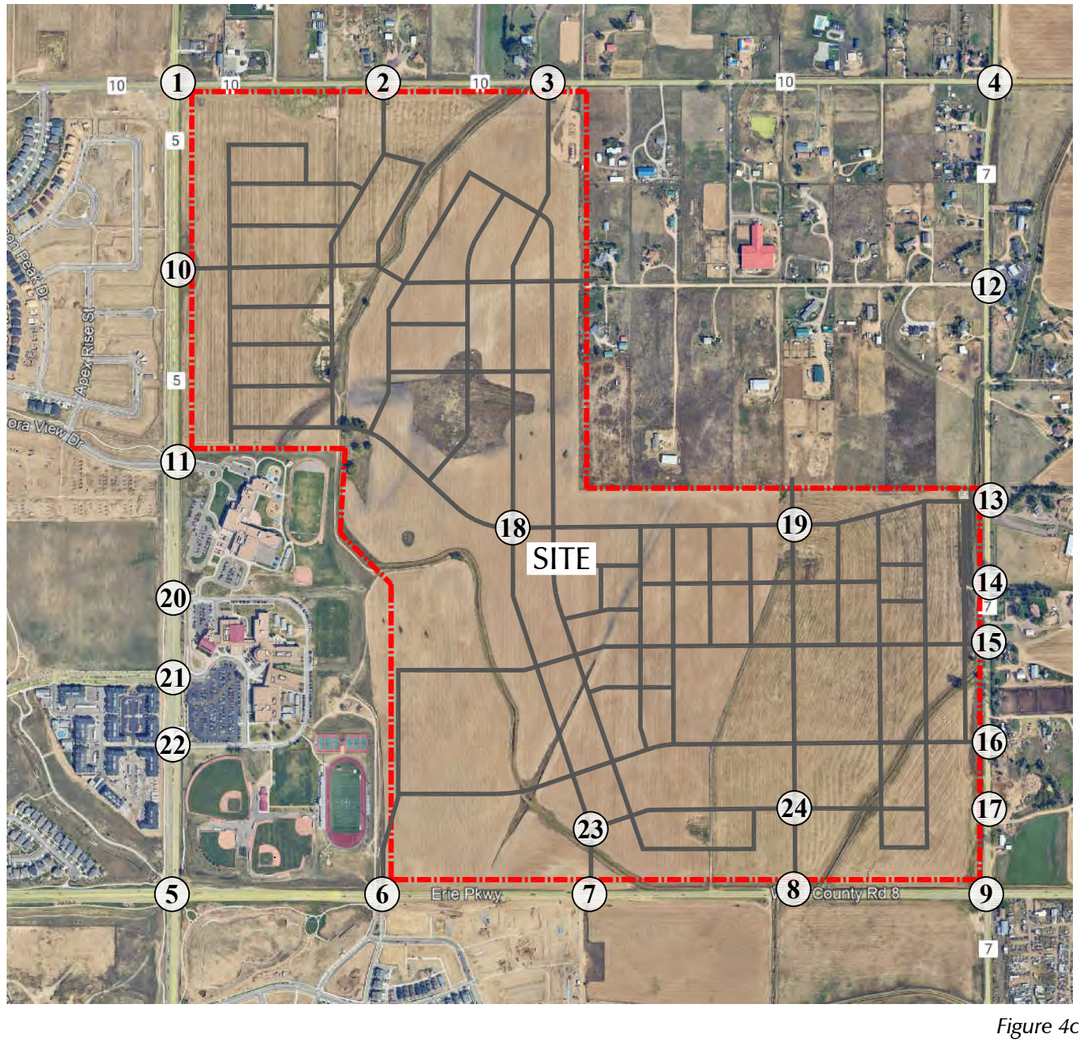
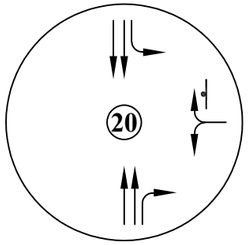


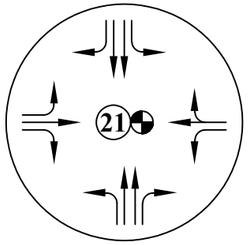
Figure 4c

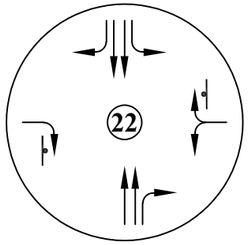
Year 2035 Background Lane Geometry and Traffic Control

North Westerly (LSC #221032)

LSC TRANSPORTATION CONSULTANTS, INC.







Intentionally
23
Left Blank

Intentionally
24
Left Blank

LEGEND:

= Stop Sign

= Traffic Signal

= Anticipated 2035 Background Improvements

Approximate Scale
Scale: 1"=1,000'

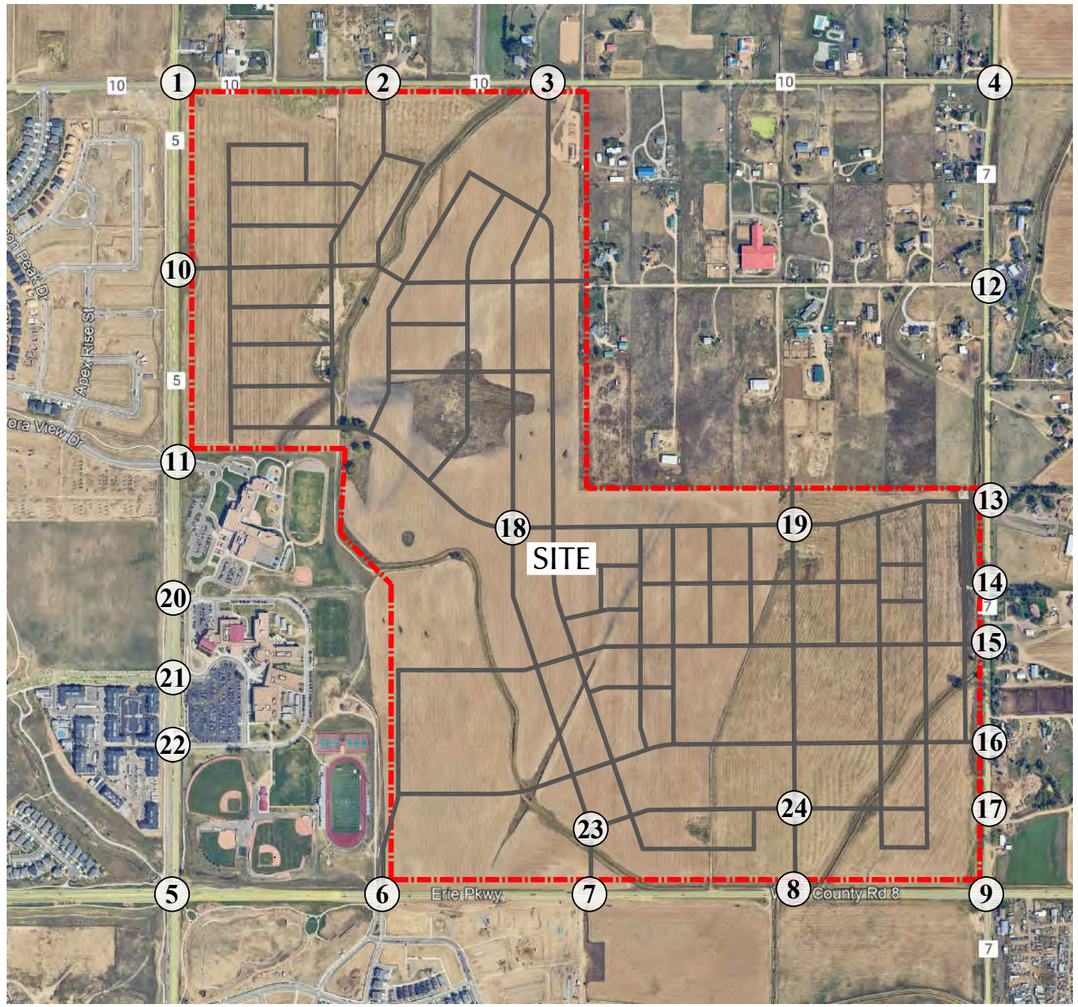
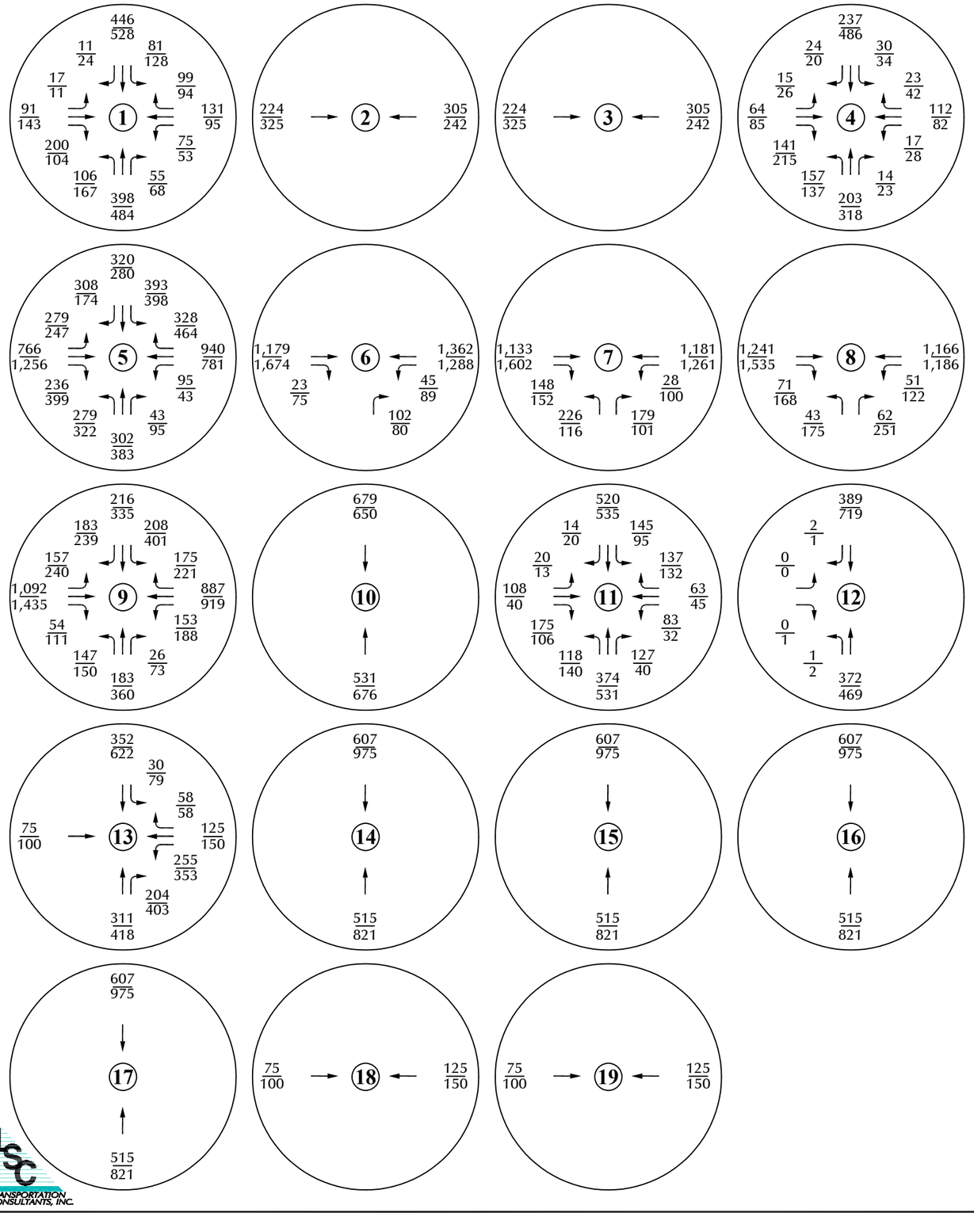


Figure 4d

Year 2035 Background Lane Geometry and Traffic Control

North Westerly (LSC #221032)

LSC TRANSPORTATION CONSULTANTS, INC.



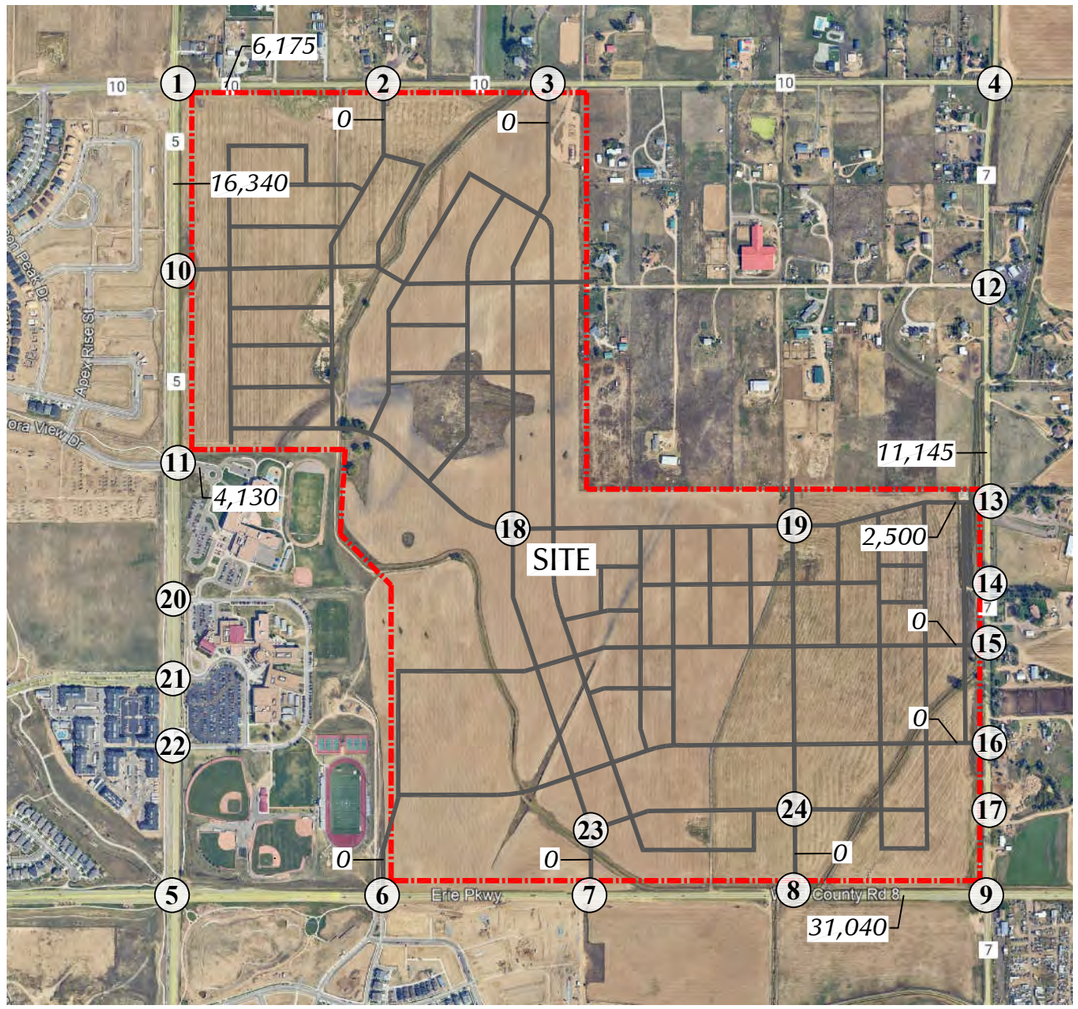
LEGEND:

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

1,000 = Average Daily Traffic

N

Approximate Scale
Scale: 1"=1,000'



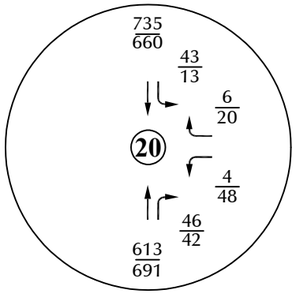
Note: The 2045 background volumes assume future access points for Erie Gateway at these locations.

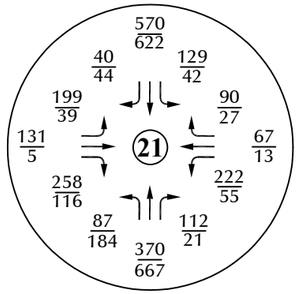
Figure 5a

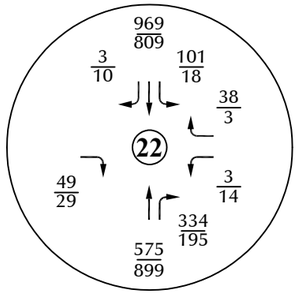
Year 2045 Background Traffic

North Westerly (LSC #221032)

TRANSPORTATION CONSULTANTS, INC.







Intentionally
23
Left Blank

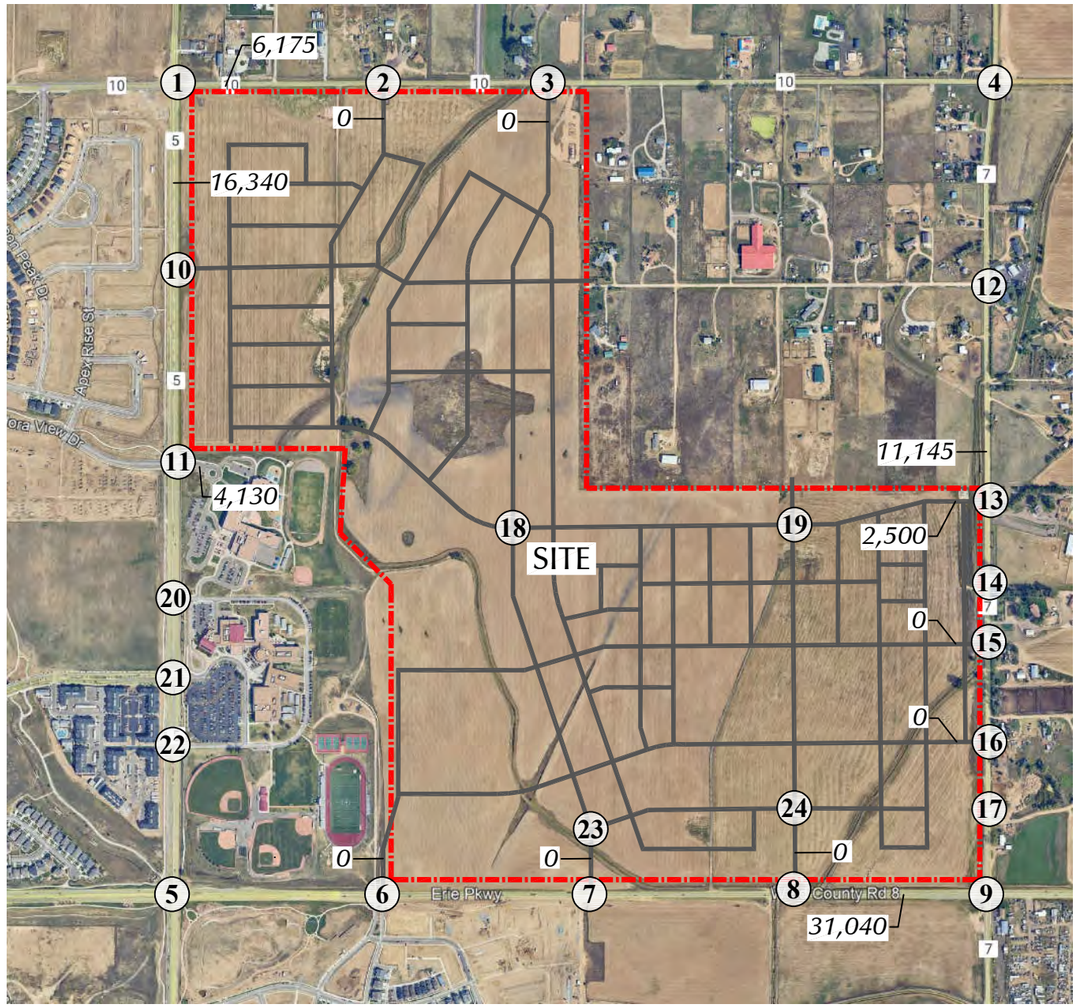
Intentionally
24
Left Blank

LEGEND:

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

1,000 = Average Daily Traffic

Approximate Scale
Scale: 1"=1,000'



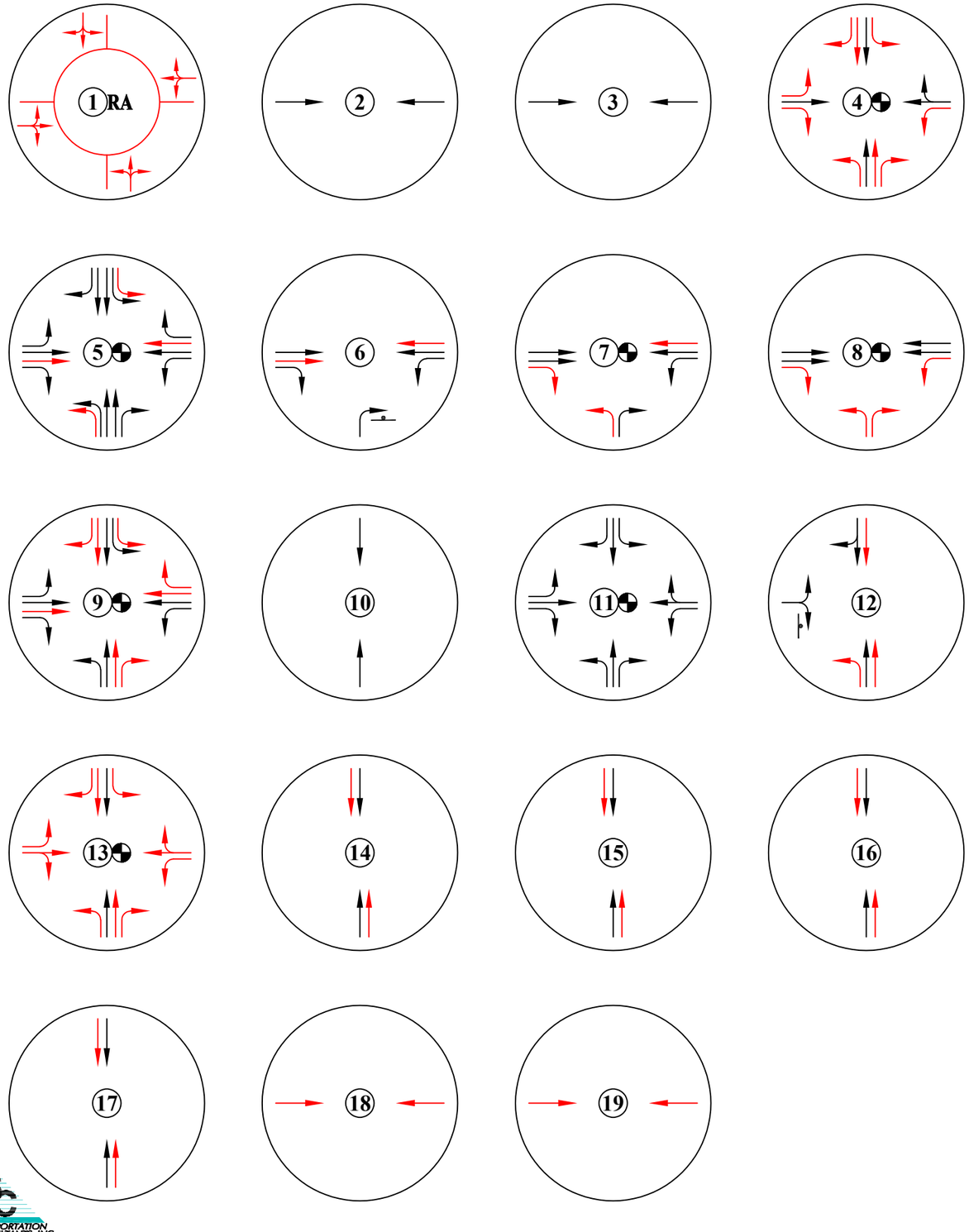
Note: The 2045 background volumes assume future access points for Erie Gateway at these locations.

Figure 5b

Year 2045 Background Traffic

North Westerly (LSC #221032)

TRANSPORTATION CONSULTANTS, INC.



LEGEND:

= Stop Sign

= Traffic Signal

RA = Modern Roundabout

= Anticipated 2045 Background Improvements

N

Approximate Scale
Scale: 1"=1,000'

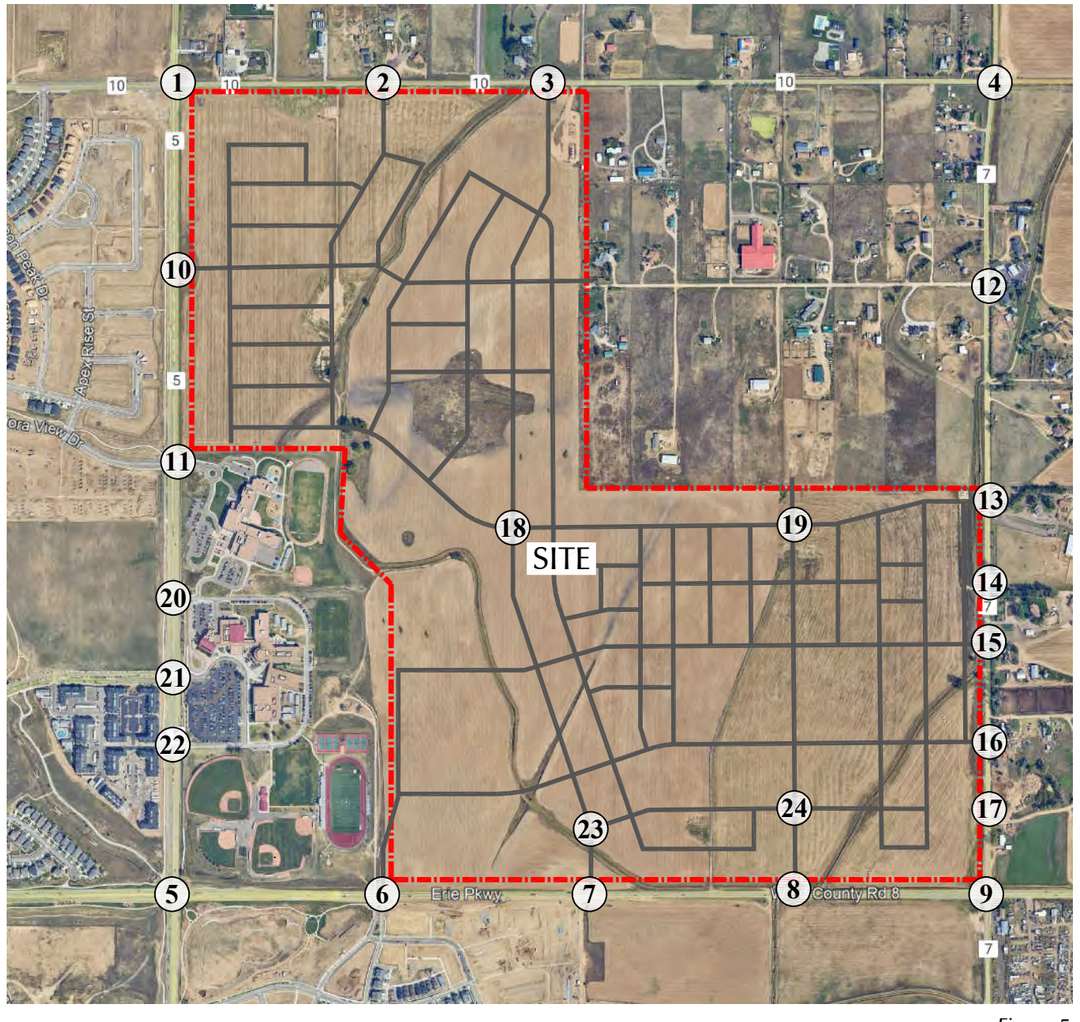
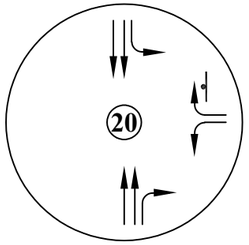


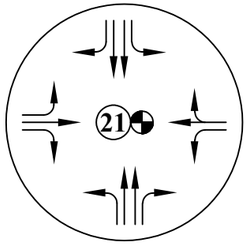
Figure 5c

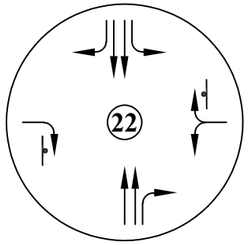
Year 2045 Background Lane Geometry and Traffic Control

North Westerly (LSC #221032)

LSC TRANSPORTATION CONSULTANTS, INC.







Intentionally
23
Left Blank

Intentionally
24
Left Blank

LEGEND:

= Stop Sign

= Traffic Signal

= Anticipated 2045 Background Improvements

Approximate Scale
Scale: 1"=1,000'

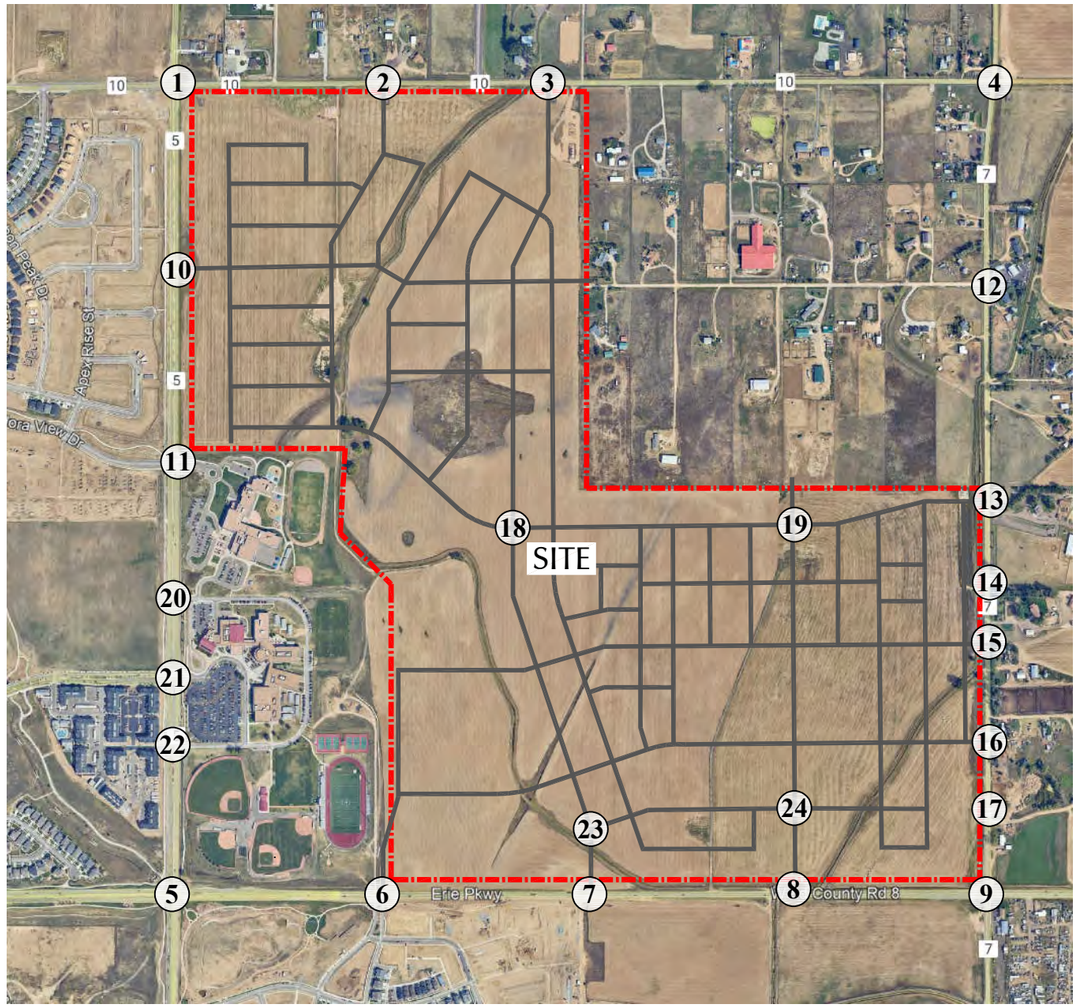
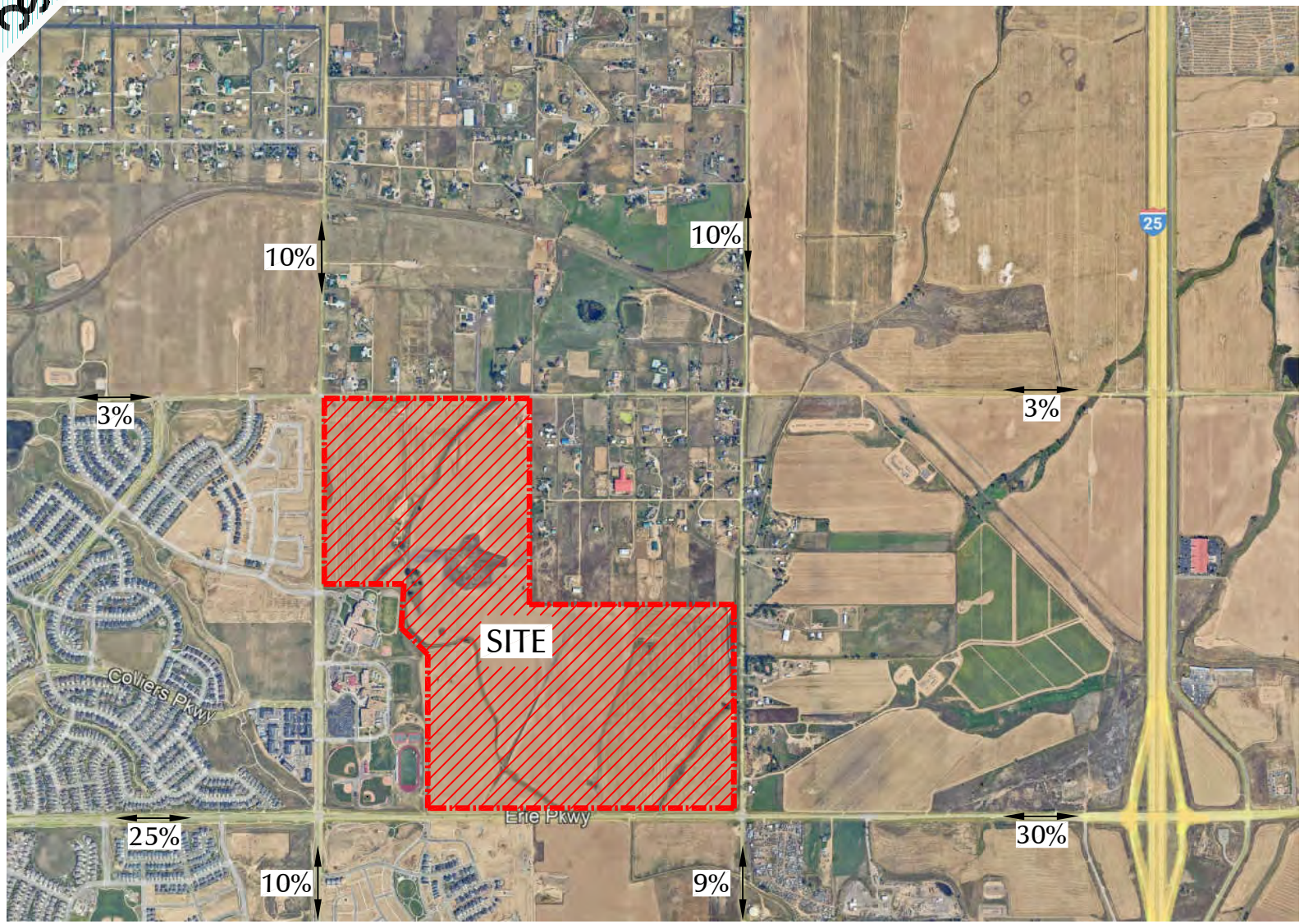


Figure 5d

Year 2045 Background Lane Geometry and Traffic Control

North Westerly (LSC #221032)

LSC TRANSPORTATION CONSULTANTS, INC.



Approximate Scale
Scale: 1"=2,000'

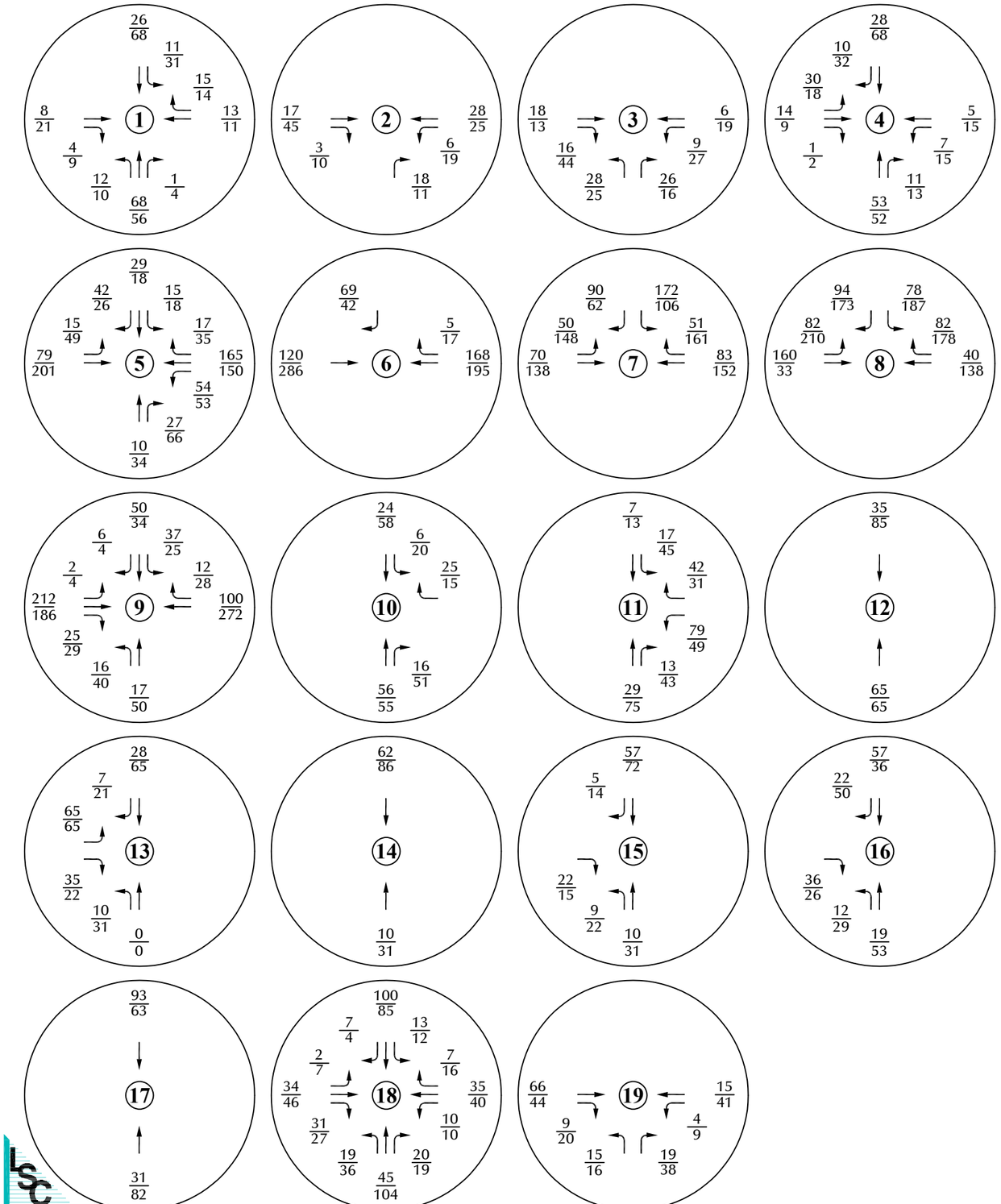
LEGEND:

65% = Percent Directional Distribution

Figure 6

Directional Distribution of Site-Generated Traffic

North Westerly (LSC #221032)



LEGEND:

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

1,000 = Average Daily Traffic

N

Approximate Scale
Scale: 1"=1,000'

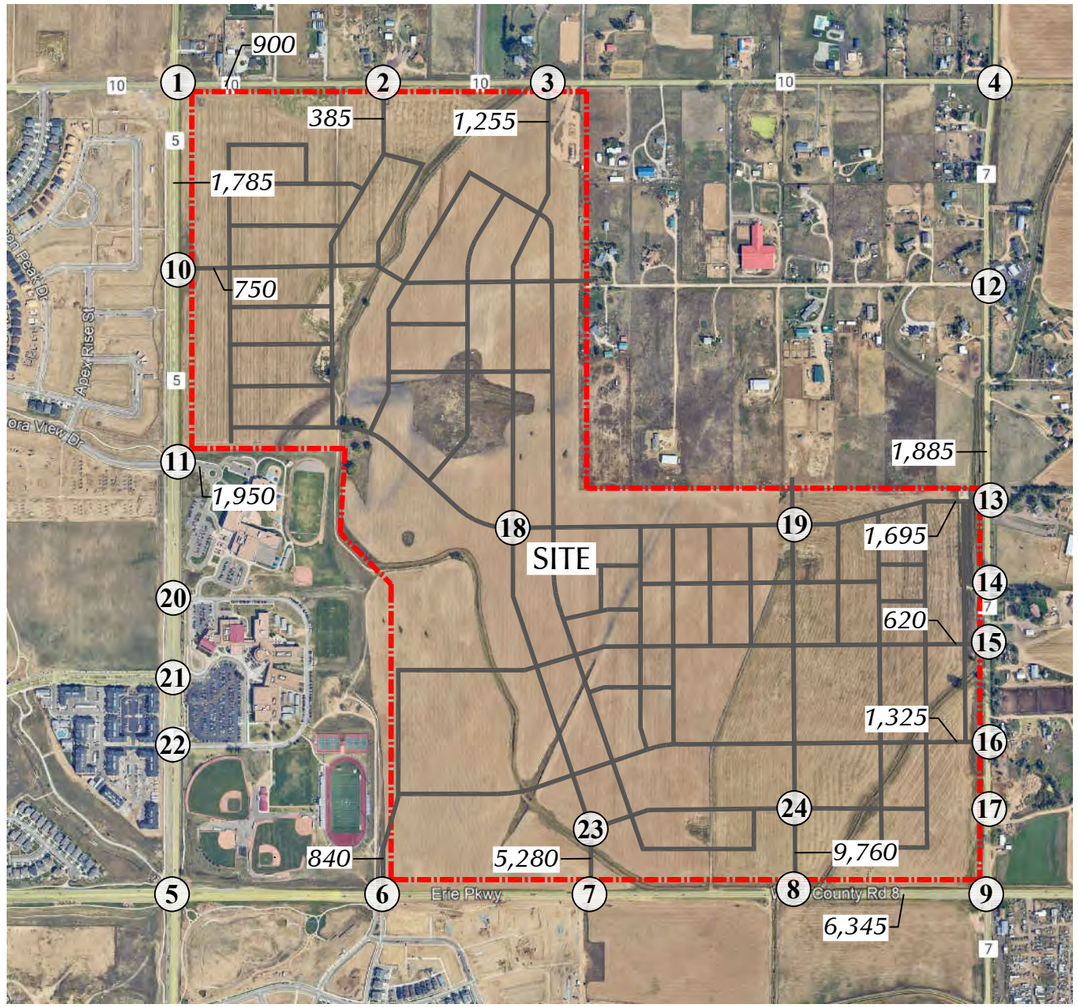
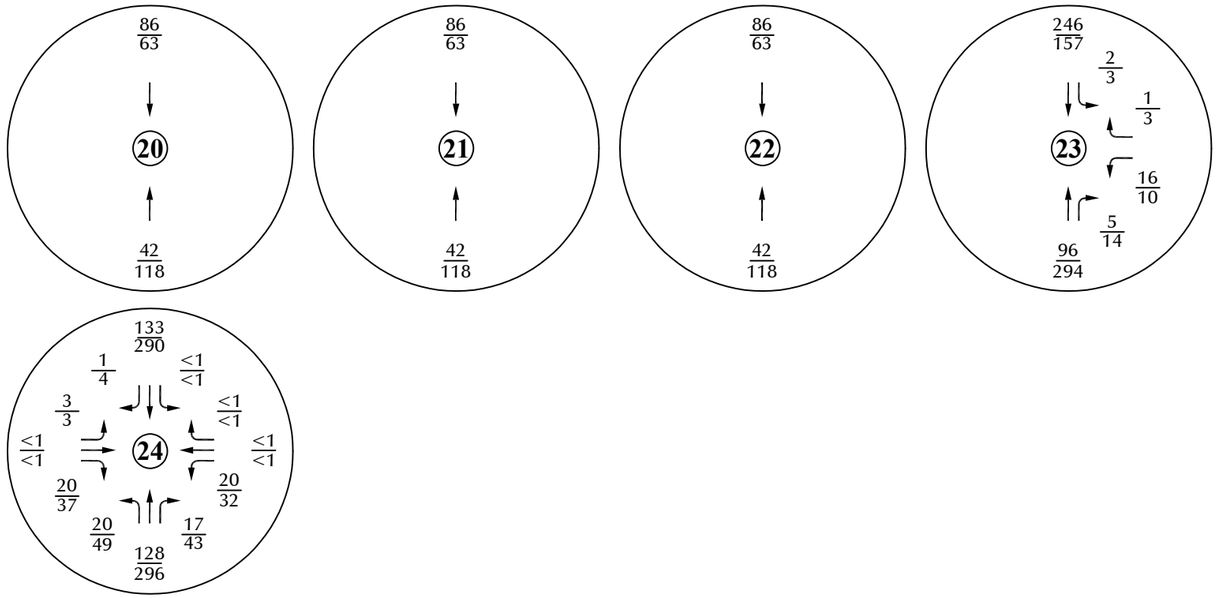


Figure 7a

Assignment of Site-Generated Traffic

North Westerly (LSC #221032)

LSC TRANSPORTATION CONSULTANTS, INC.



LEGEND:

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

1,000 = Average Daily Traffic

N

Approximate Scale
Scale: 1"=1,000'

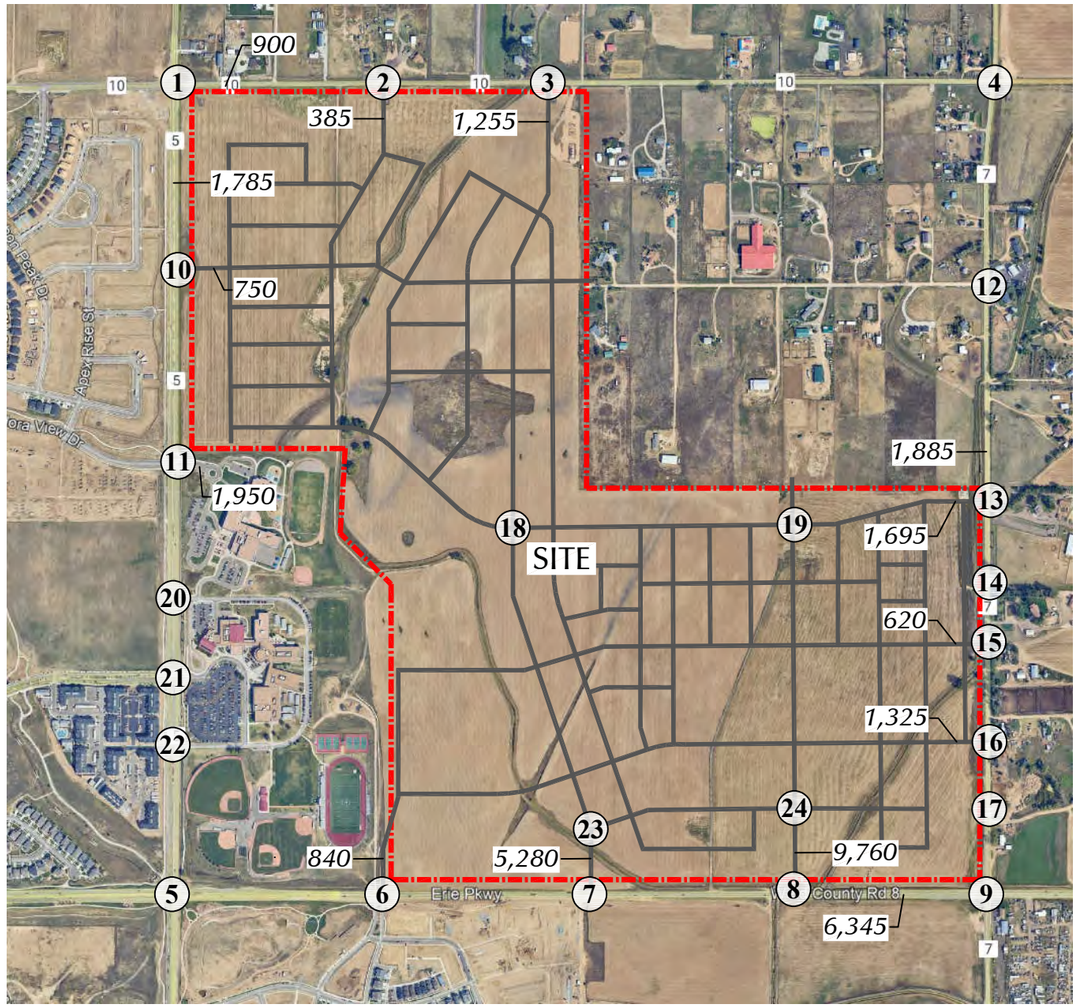
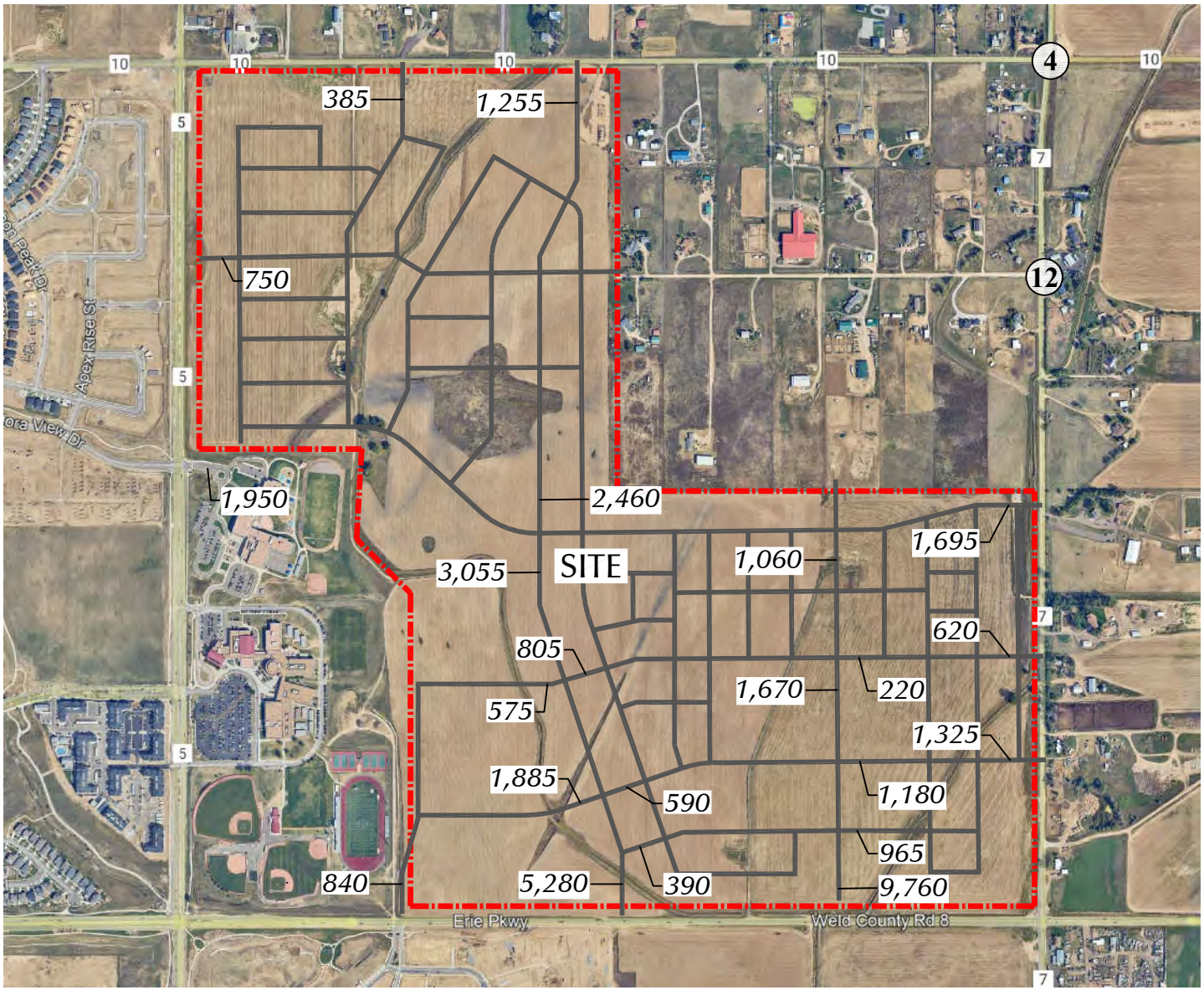


Figure 7b

Assignment of Site-Generated Traffic

North Westerly (LSC #221032)

TRANSPORTATION CONSULTANTS, INC.



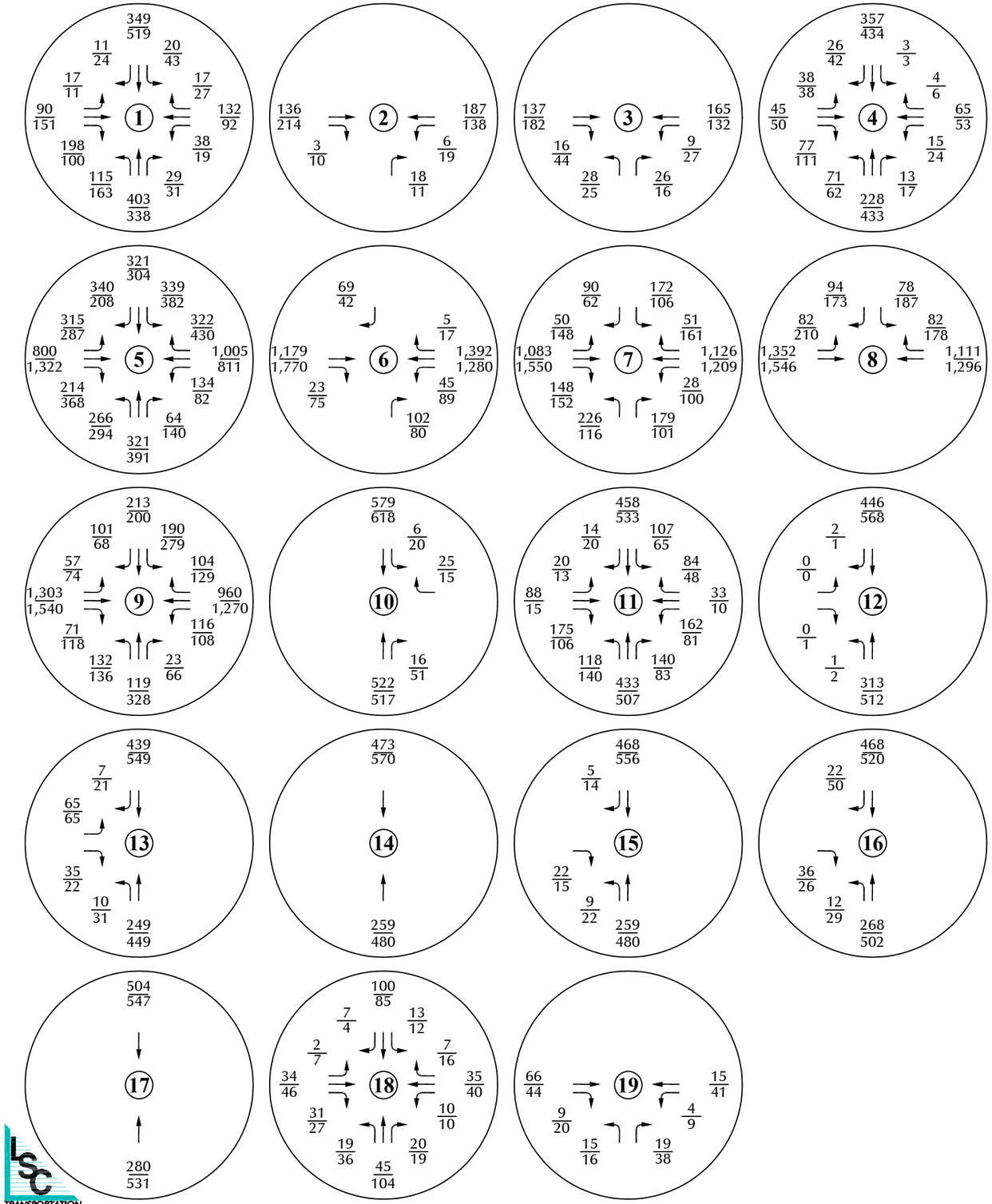
Approximate Scale
Scale: 1"=1,000'

Figure 7c

Average Weekday Traffic on Internal Roadways

North Westerly (LSC #221032)

LEGEND:
1,000 = Average Daily Traffic



LEGEND:

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

1,000 = Average Daily Traffic

N

Approximate Scale
Scale: 1"=1,000'

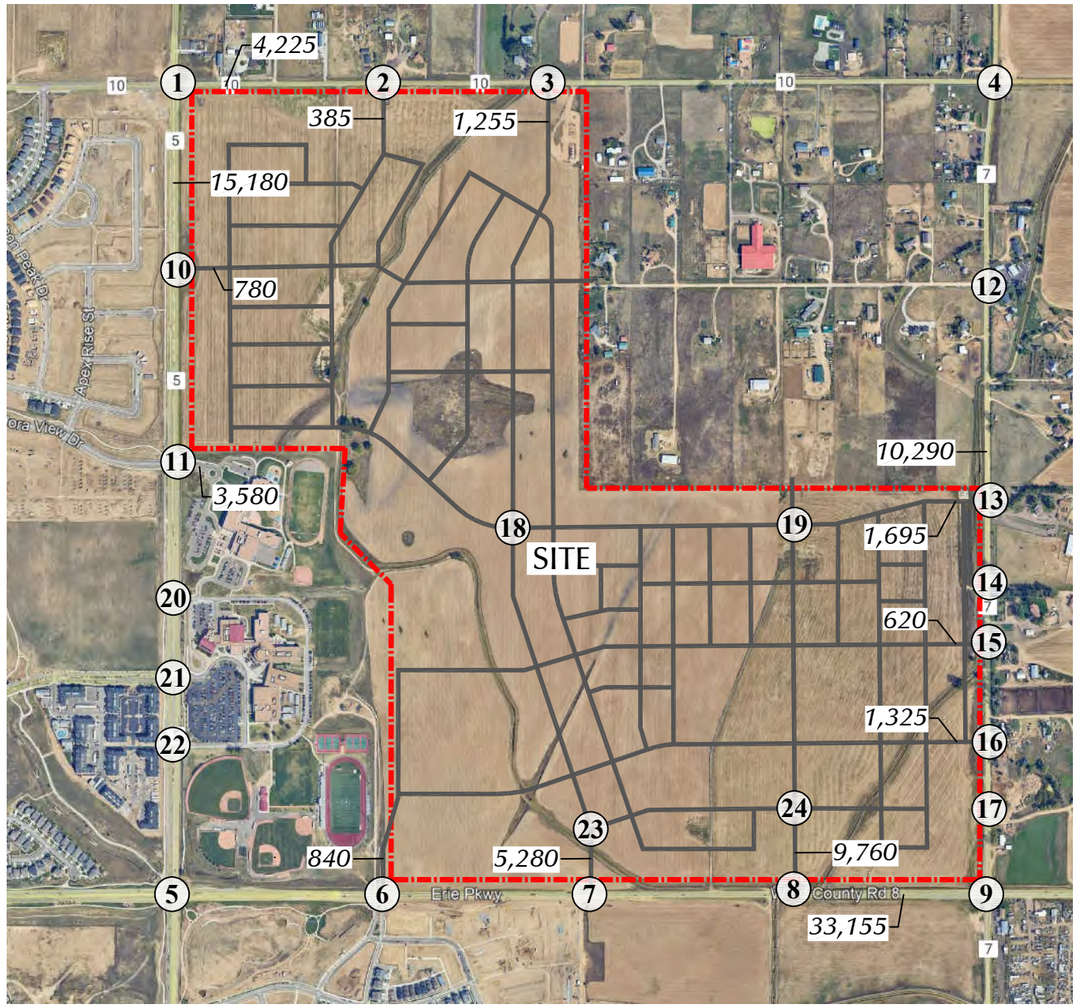
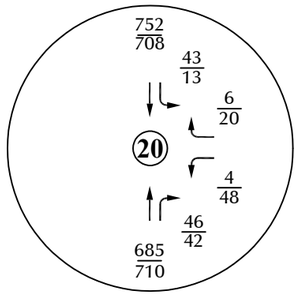


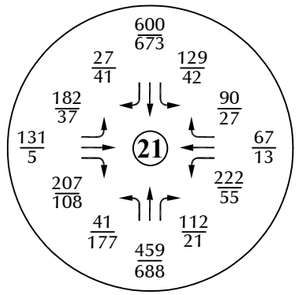
Figure 8a

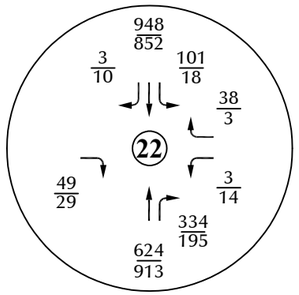
Year 2035 Total Traffic

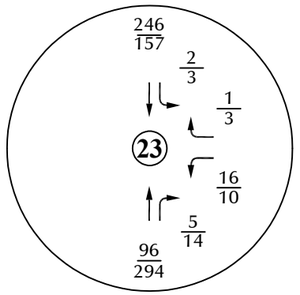
North Westerly (LSC #221032)

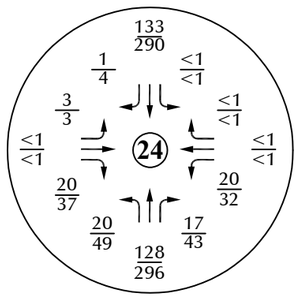
LSC TRANSPORTATION CONSULTANTS, INC.











LEGEND:

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

1,000 = Average Daily Traffic

Approximate Scale
Scale: 1"=1,000'

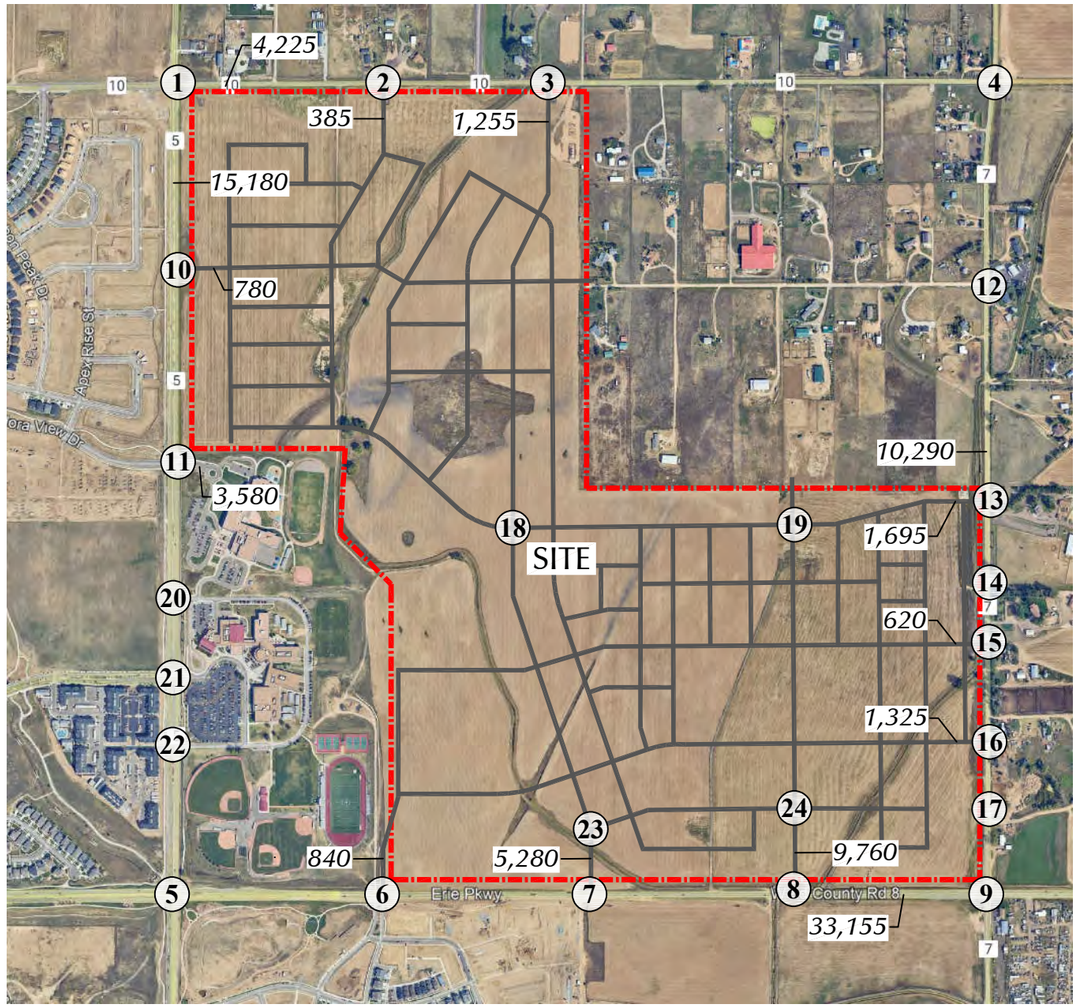
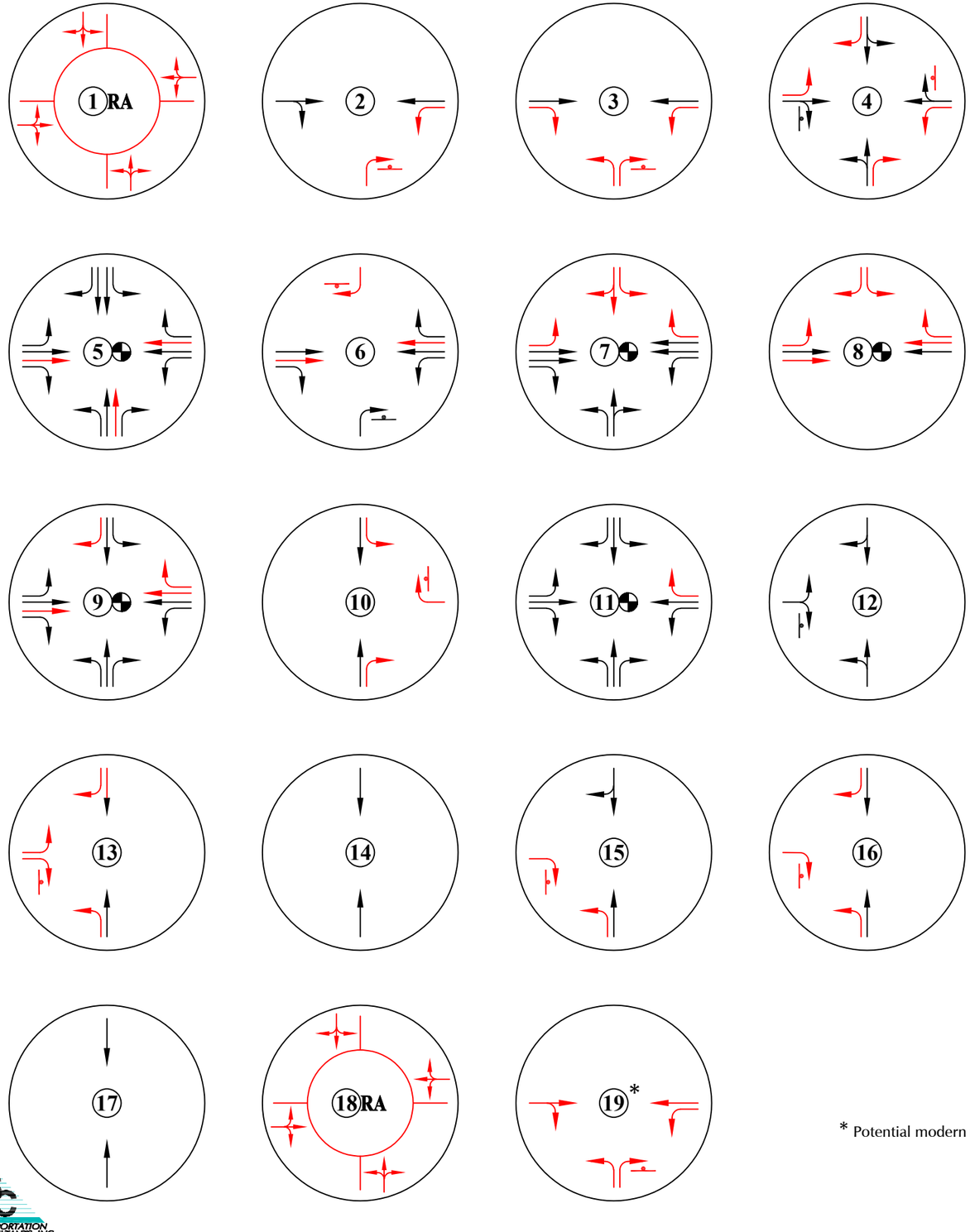


Figure 8b

Year 2035 Total Traffic

North Westerly (LSC #221032)

TRANSPORTATION CONSULTANTS, INC.



LEGEND:

= Stop Sign

= Traffic Signal

RA = Modern Roundabout

= Anticipated 2035 Improvements with the North Westerly Development

N

Approximate Scale
Scale: 1"=1,000'

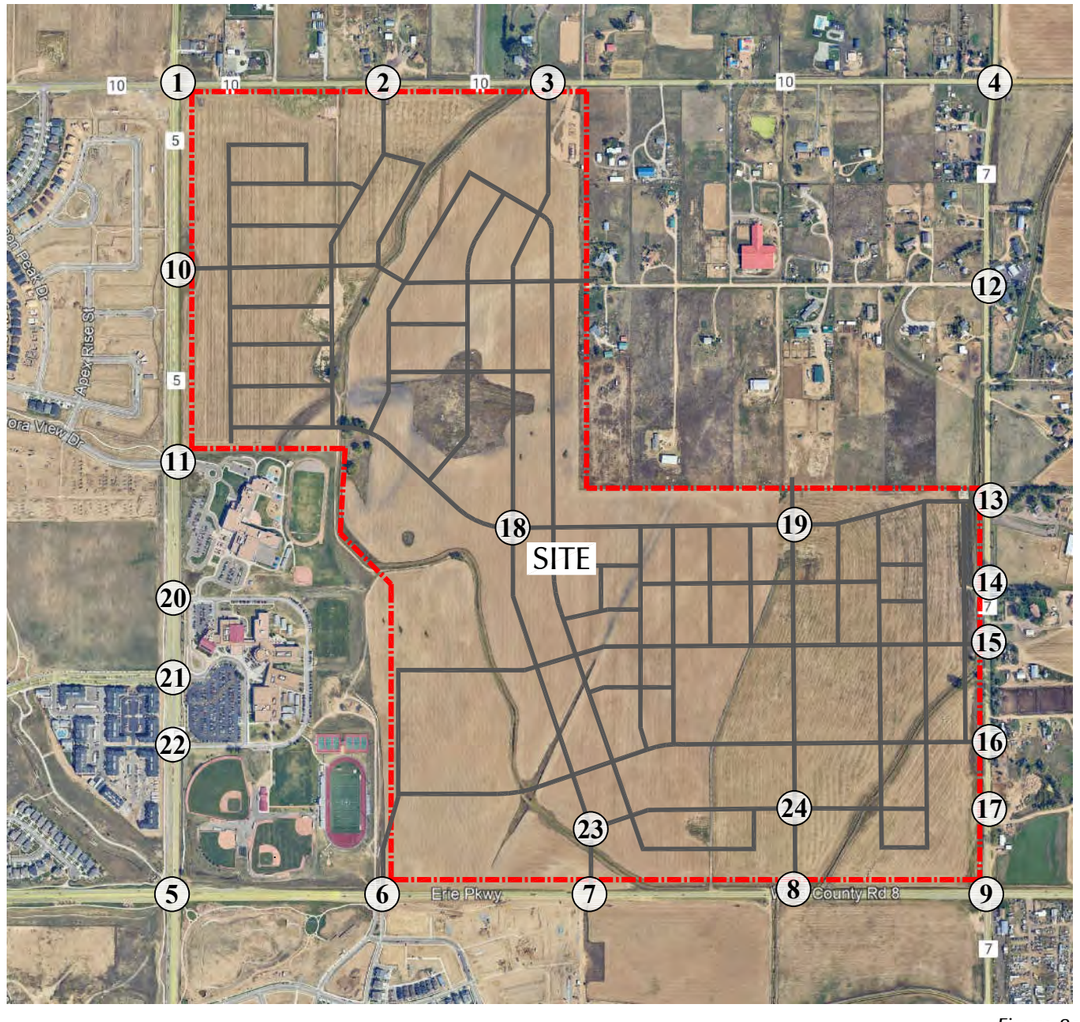


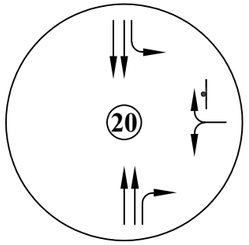
Figure 8c

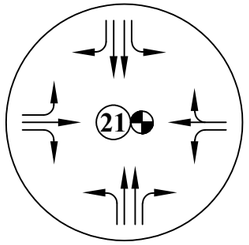
* Potential modern roundabout to be determined with the Preliminary Plan.

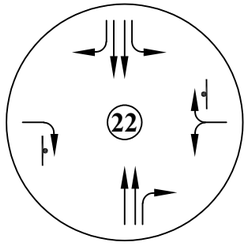
Year 2035 Total Lane Geometry and Traffic Control

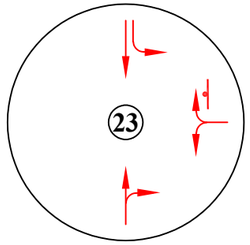
North Westerly (LSC #221032)

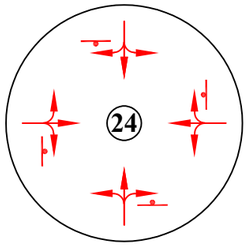
LSC TRANSPORTATION CONSULTANTS, INC.











LEGEND:

= Stop Sign

= Traffic Signal

= Anticipated 2035 Improvements with the North Westerly Development

Approximate Scale
Scale: 1"=1,000'

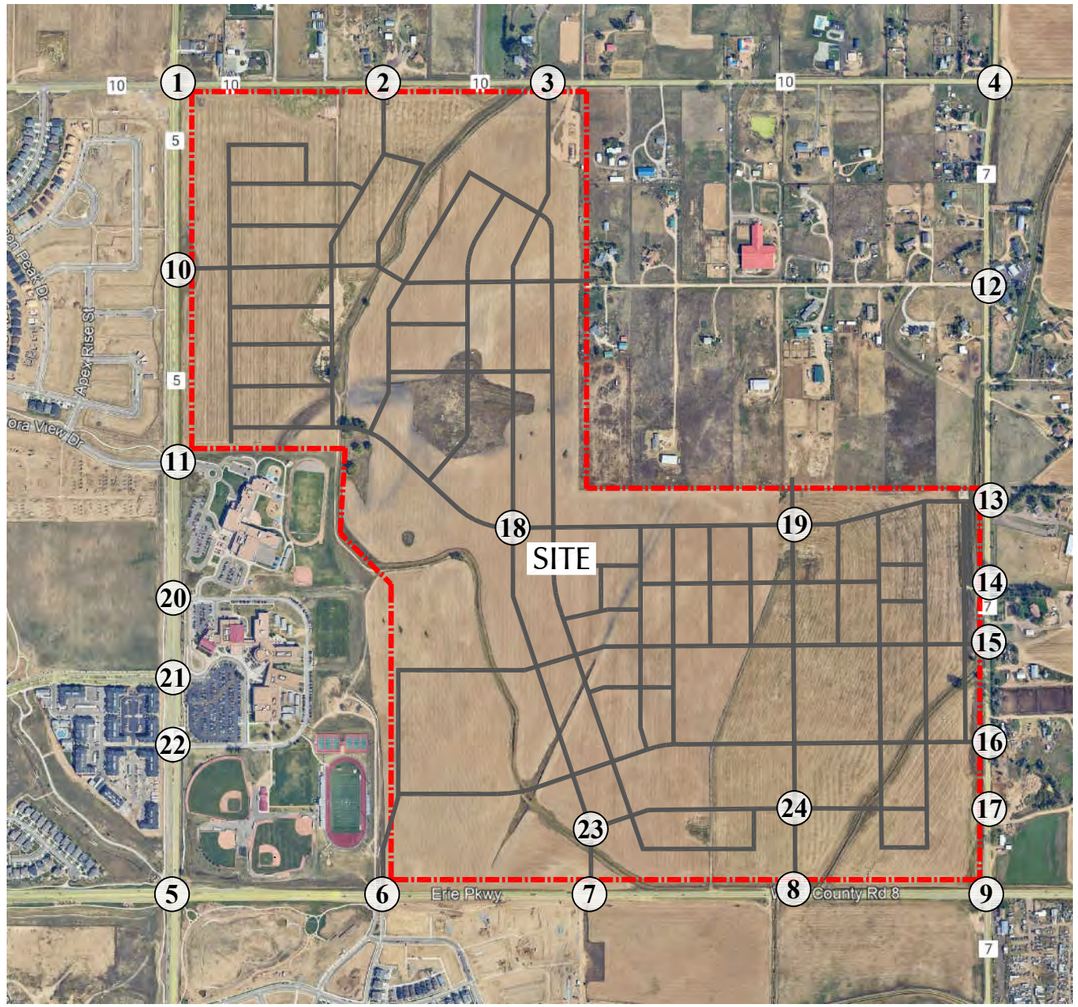
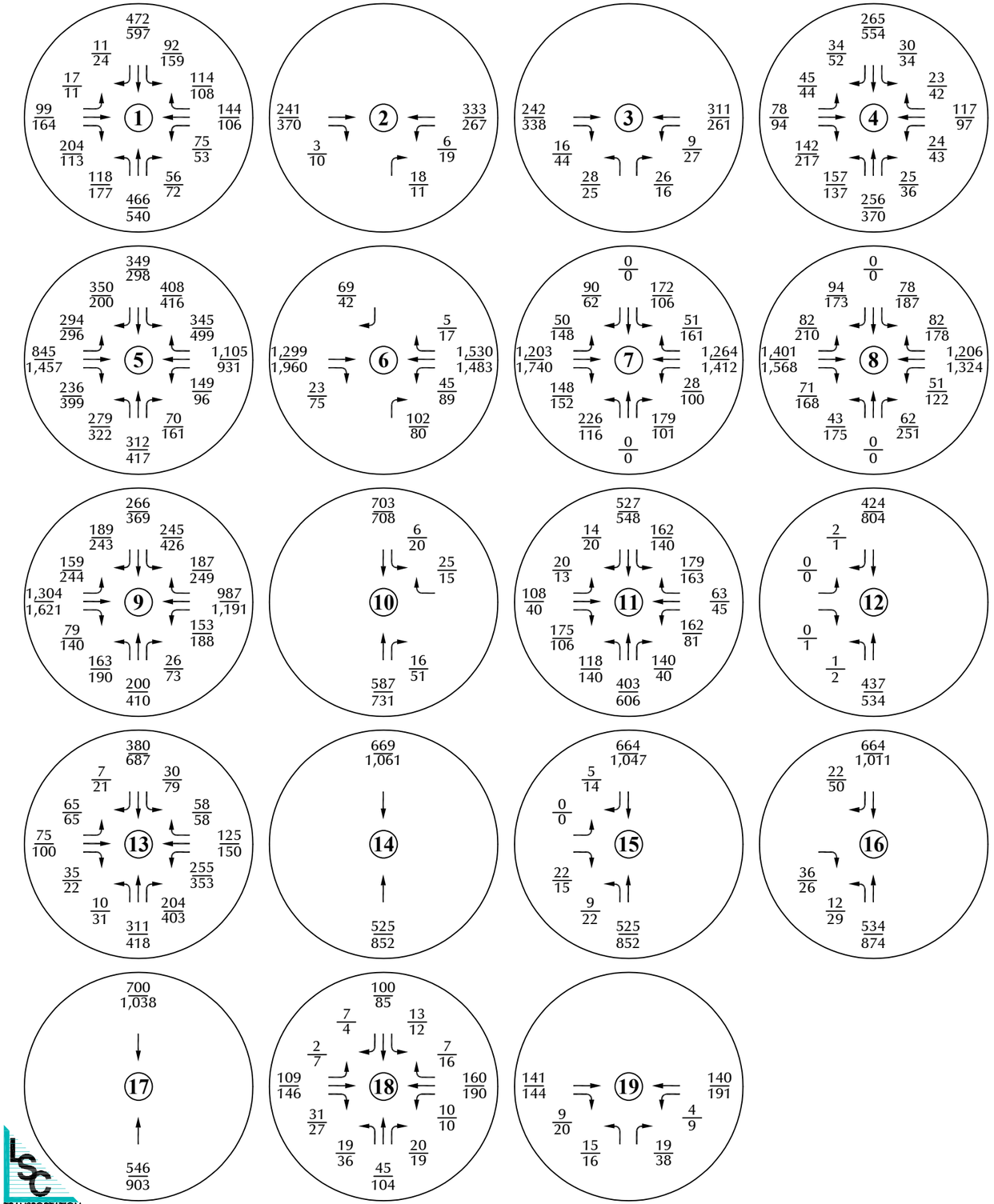


Figure 8d

Year 2035 Total Lane Geometry and Traffic Control

North Westerly (LSC #221032)

TRANSPORTATION CONSULTANTS, INC.



LEGEND:

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

1,000 = Average Daily Traffic

N

Approximate Scale
Scale: 1"=1,000'

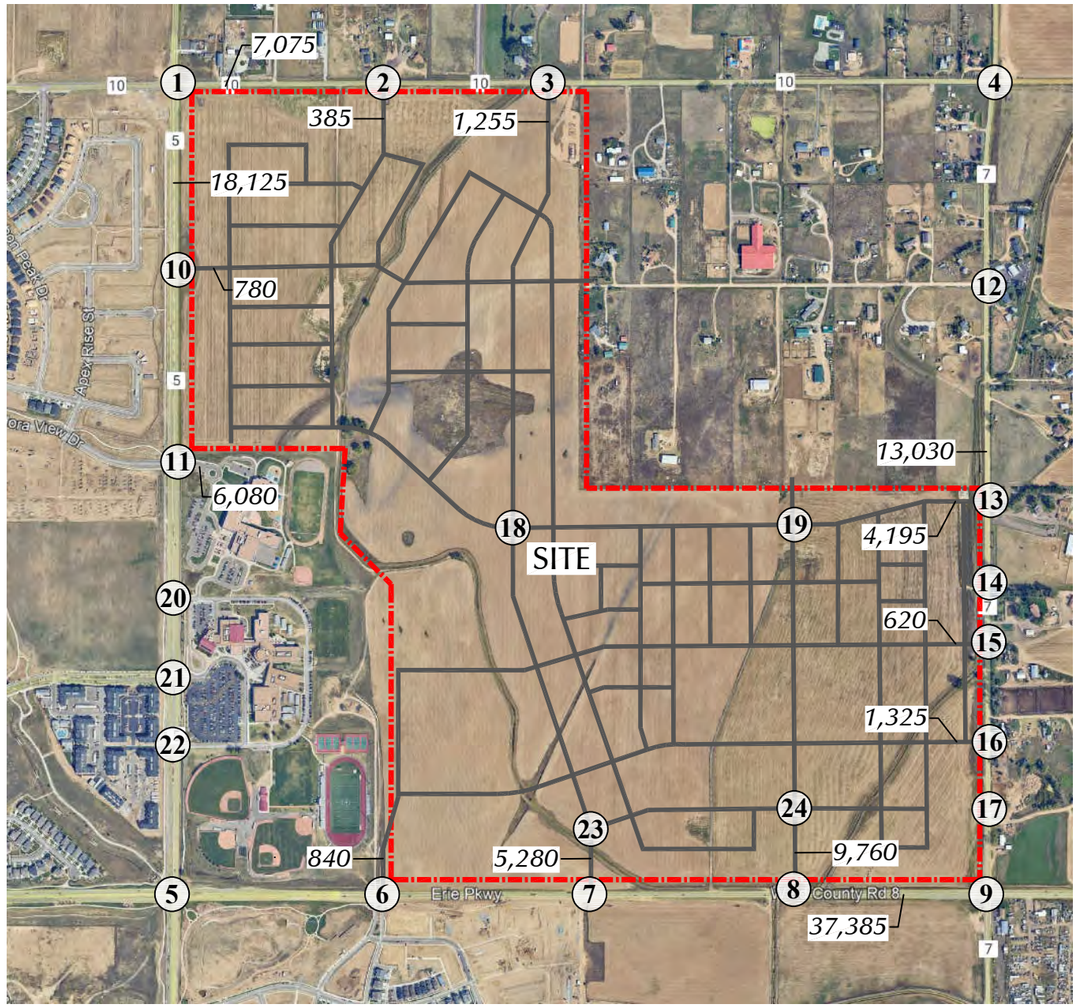
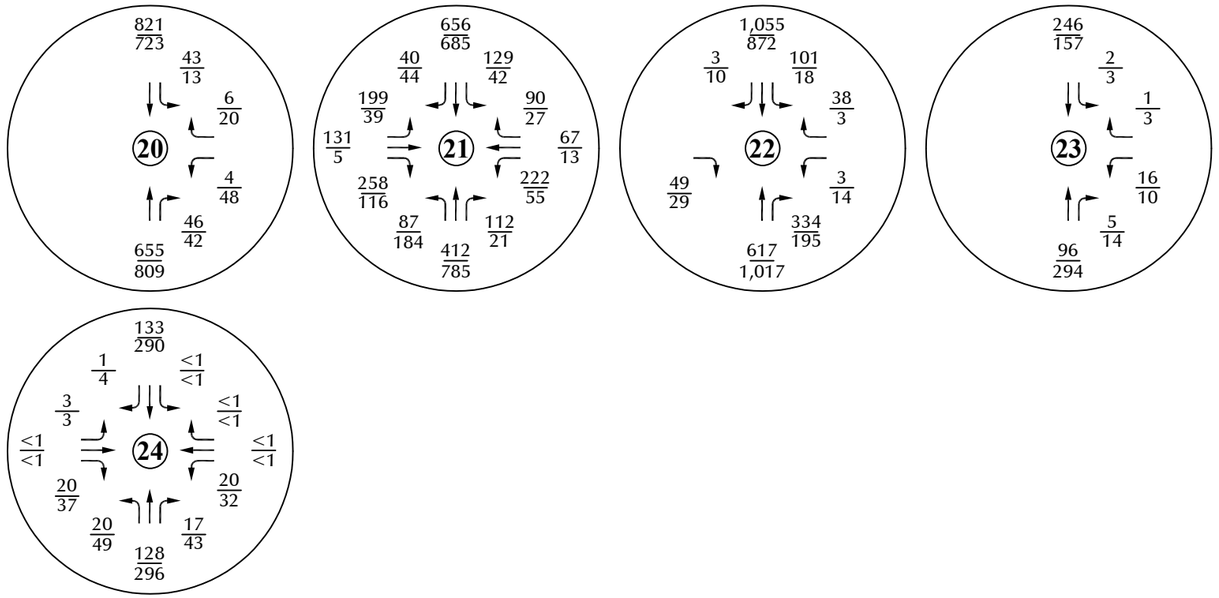


Figure 9a

Year 2045 Total Traffic

North Westerly (LSC #221032)

LSC TRANSPORTATION CONSULTANTS, INC.



LEGEND:

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

1,000 = Average Daily Traffic

N

Approximate Scale
Scale: 1"=1,000'

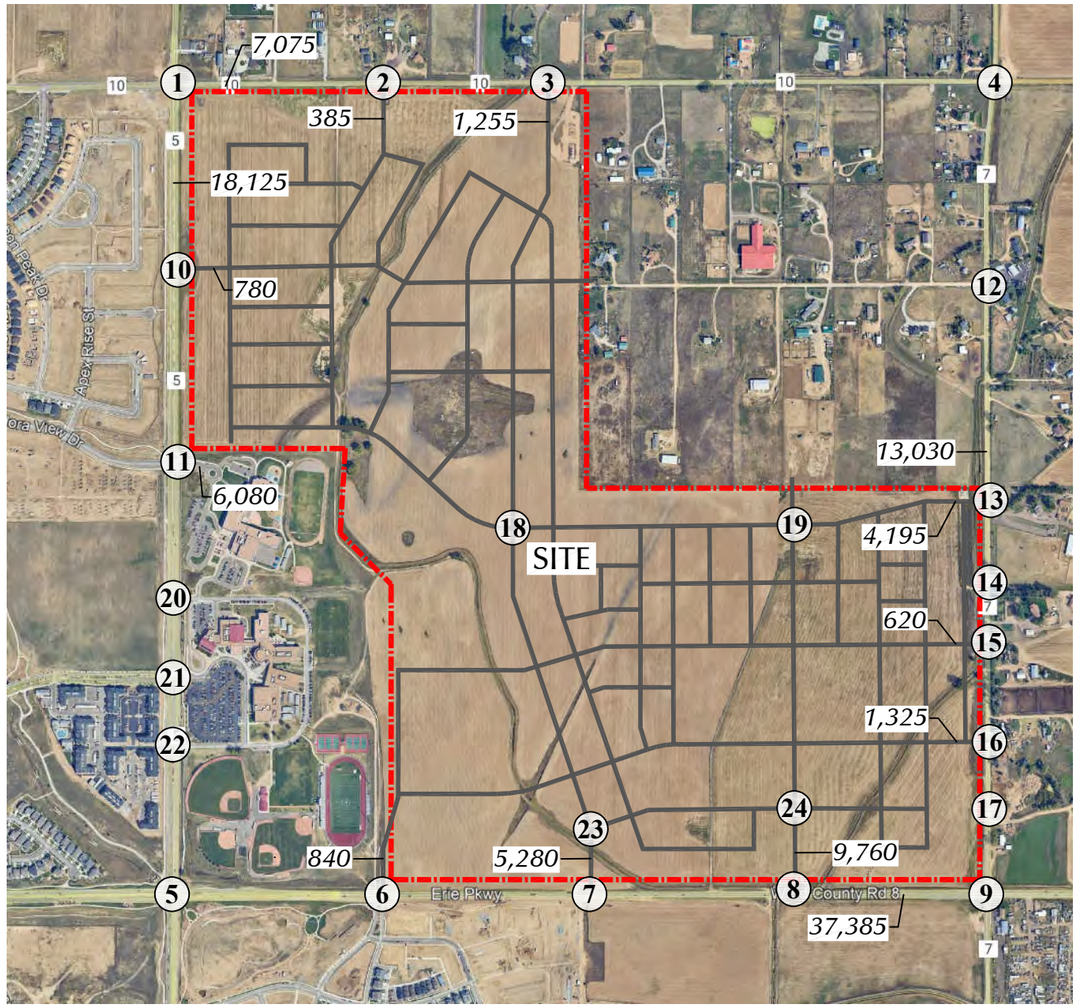
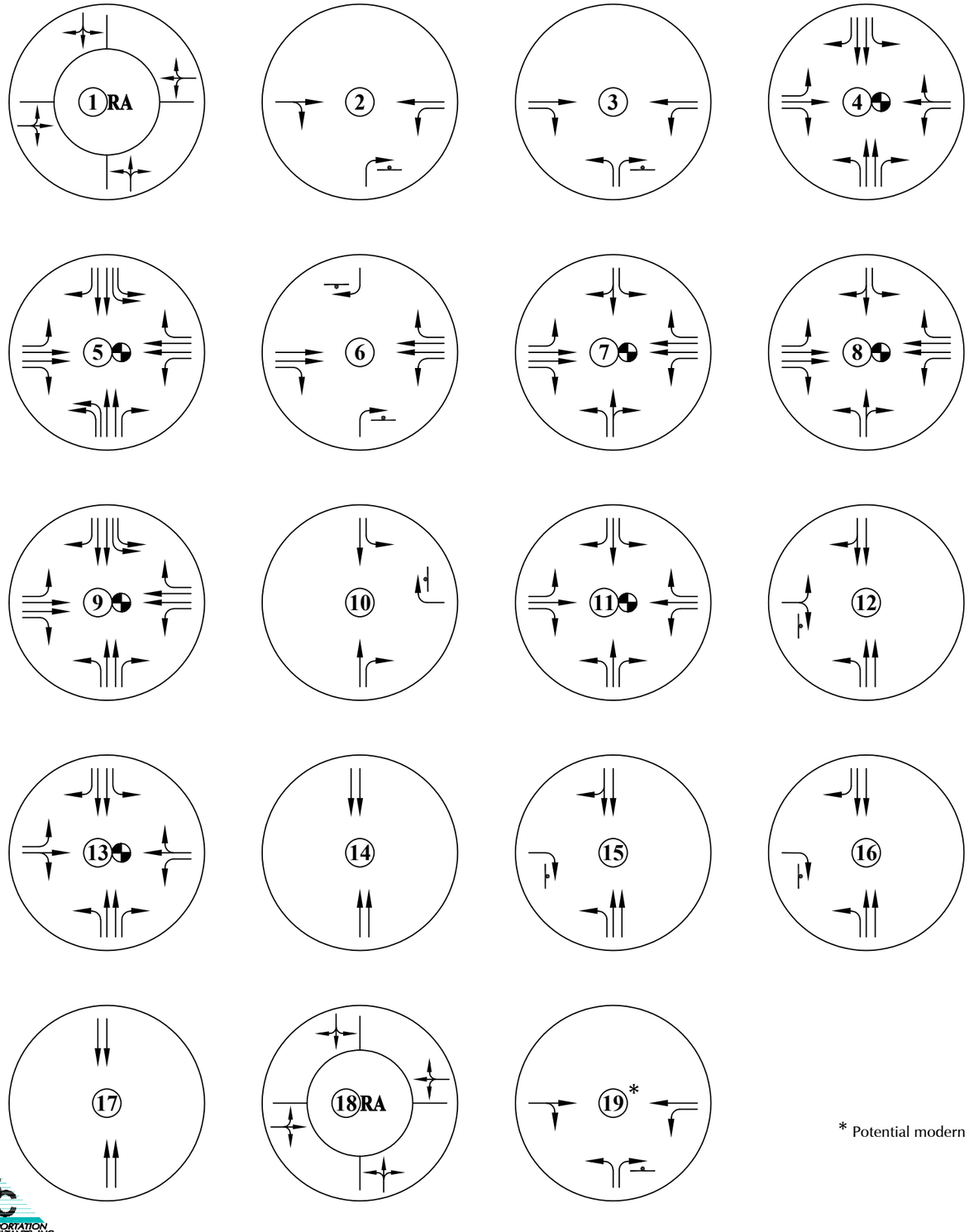


Figure 9b

Year 2045 Total Traffic

North Westerly (LSC #221032)

TRANSPORTATION CONSULTANTS, INC.



LEGEND:

= Stop Sign

= Traffic Signal

RA = Modern Roundabout

N

Approximate Scale
Scale: 1"=1,000'

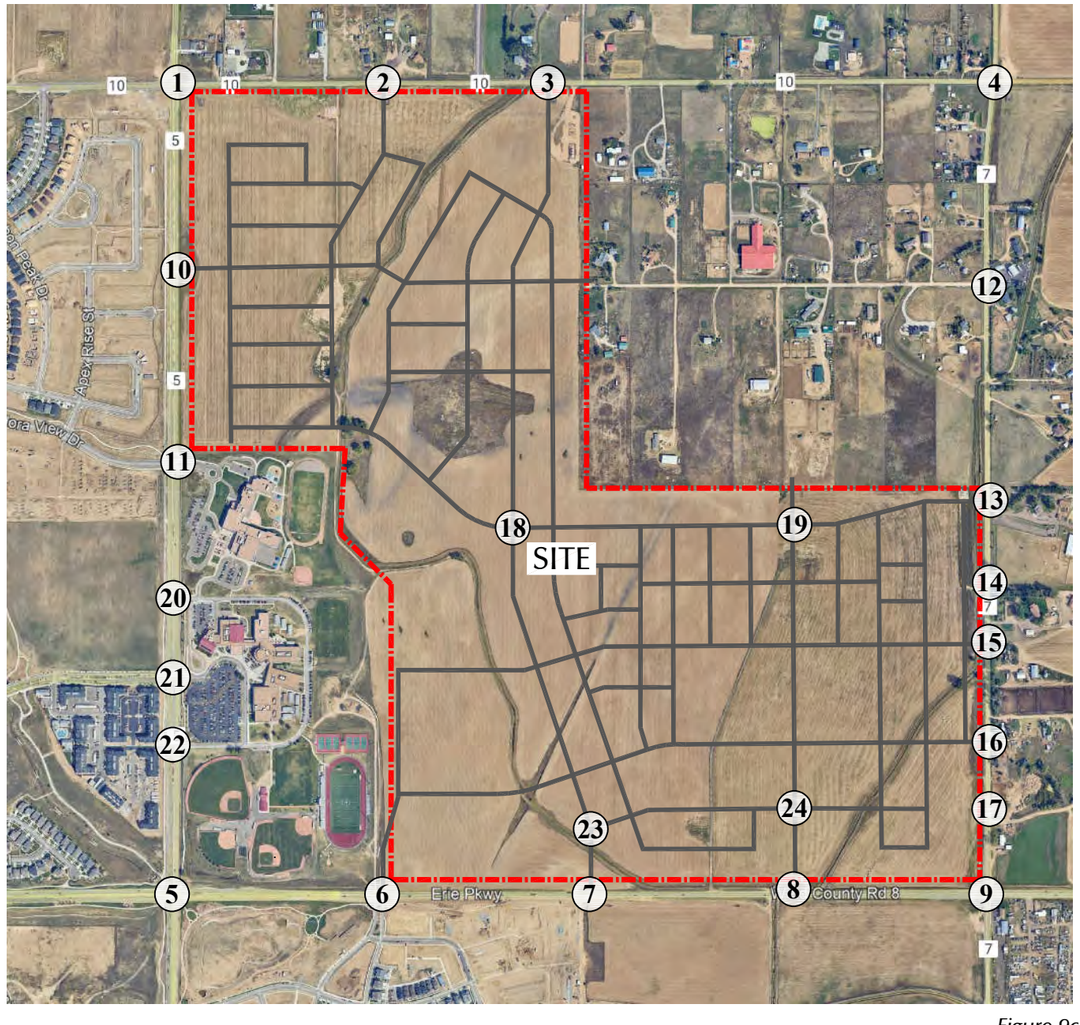


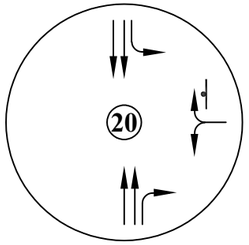
Figure 9c

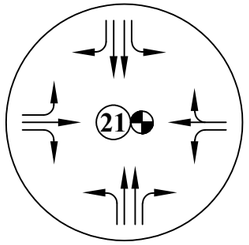
* Potential modern roundabout to be determined with the Preliminary Plan.

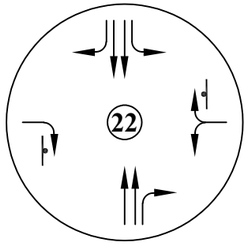
Year 2045 Total Lane Geometry and Traffic Control

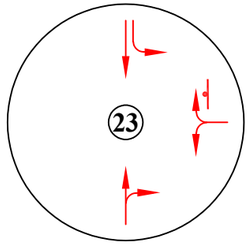
North Westerly (LSC #221032)

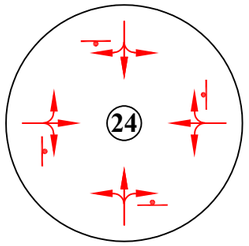
LSC TRANSPORTATION CONSULTANTS, INC.











LEGEND:

= Stop Sign

= Traffic Signal

Approximate Scale
Scale: 1"=1,000'

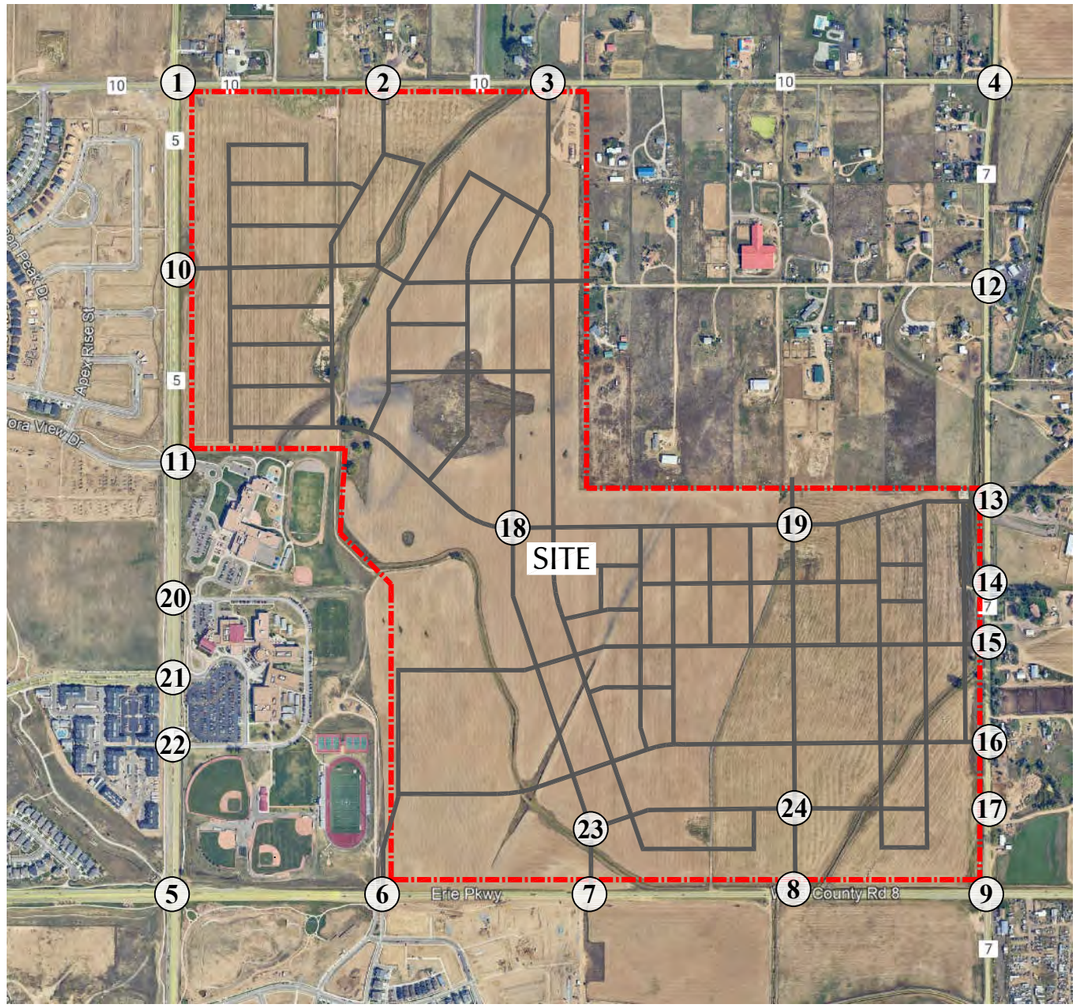


Figure 9d

Year 2045 Total Lane Geometry and Traffic Control

North Westerly (LSC #221032)

LSC TRANSPORTATION CONSULTANTS, INC.

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	North Westerly	**Organization:**	LSC Transportation Consultants, Inc
Project Location:	Erie, CO	**Performed By:**	KDF
Scenario Description:	Buildout	**Date:**	
Analysis Year:	2044	**Checked By:**	
Analysis Period:	**AM Street Peak Hour**	**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				245	152	93
Restaurant				0		
Cinema/Entertainment				0		
Residential				1,067	274	793
Hotel				0		
All Other Land Uses[2]				0		
				1,312	426	886

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	5	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	8	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	1,312	426	886
Internal Capture Percentage	2%	3%	1%
External Vehicle-Trips[5]	1,286	413	873
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	5%	5%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	2%	1%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	North Westerly	**Organization:**	LSC Transportation Consultants, Inc
Project Location:	Erie, CO	**Performed By:**	KDF
Scenario Description:	Buildout	**Date:**	10/14/2024
Analysis Year:	2044	**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				734	360	374
Restaurant				0		
Cinema/Entertainment				0		
Residential				1,365	839	526
Hotel				0		
All Other Land Uses[2]				0		
				2,099	1,199	900

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail					2640	
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	43	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	36	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	2,099	1,199	900
Internal Capture Percentage	8%	7%	9%
External Vehicle-Trips[5]	1,941	1,120	821
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	10%	11%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	5%	7%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Traffic Counts

COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

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

File Name : WCR 5 COLLIER'S PKWY
Site Code : 00000025
Start Date : 2/4/2025
Page No : 1

Groups Printed- Unshifted

	WCR 5 SOUTHBOUND				ERIE HIGH SHCOOL WESTBOUND				WCR 5 NORTHBOUND				COLLIERS PKWY EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	0	21	0	0	4	2	0	0	3	34	1	0	0	0	18	4	87
06:45 AM	0	35	0	0	3	2	1	0	6	25	0	0	1	2	39	0	114
Total	0	56	0	0	7	4	1	0	9	59	1	0	1	2	57	4	201
07:00 AM	2	42	0	2	6	1	4	0	12	48	3	0	8	3	29	0	160
07:15 AM	36	40	1	4	52	17	12	12	2	52	13	0	37	35	57	0	370
07:30 AM	68	73	1	5	92	23	48	21	17	51	79	1	19	76	64	0	638
07:45 AM	8	81	1	2	59	14	20	9	18	63	14	0	21	13	48	0	371
Total	114	236	3	13	209	55	84	42	49	214	109	1	85	127	198	0	1539
08:00 AM	6	79	23	6	11	11	7	32	9	77	1	4	101	2	38	0	407
08:15 AM	5	131	21	0	7	2	0	12	15	71	1	4	37	0	41	0	347
Total	11	210	44	6	18	13	7	44	24	148	2	8	138	2	79	0	754
02:30 PM	10	31	2	1	21	10	13	2	32	43	11	5	19	3	10	0	213
02:45 PM	14	77	9	23	125	43	33	77	87	93	1	22	22	0	43	0	669
Total	24	108	11	24	146	53	46	79	119	136	12	27	41	3	53	0	882
03:00 PM	11	56	5	0	49	9	15	3	22	47	1	0	24	2	13	0	257
03:15 PM	11	65	8	2	14	6	7	5	27	47	5	0	12	21	38	0	268
03:30 PM	5	122	38	27	28	16	19	90	42	56	3	8	13	1	36	0	504
03:45 PM	0	68	3	0	15	2	6	3	32	58	0	2	15	1	22	0	227
Total	27	311	54	29	106	33	47	101	123	208	9	10	64	25	109	0	1256
04:00 PM	0	37	6	0	39	8	20	10	29	56	0	9	7	1	27	0	249
04:15 PM	0	58	6	0	12	0	2	0	49	64	0	0	12	1	27	0	231
04:30 PM	0	67	7	0	4	1	0	0	39	53	0	0	9	0	37	0	217
04:45 PM	3	76	8	2	4	1	3	0	40	72	0	0	11	0	21	0	241
Total	3	238	27	2	59	10	25	10	157	245	0	9	39	2	112	0	938
05:00 PM	1	69	14	2	15	3	9	3	52	61	2	0	4	0	23	0	258
05:15 PM	20	74	11	0	14	6	12	0	39	68	8	0	6	3	25	0	286
05:30 PM	16	60	8	0	18	2	1	1	38	65	10	1	14	1	39	0	274
05:45 PM	14	50	8	0	16	3	3	0	42	65	2	0	9	3	26	0	241
Total	51	253	41	2	63	14	25	4	171	259	22	1	33	7	113	0	1059
Grand Total	230	1412	180	76	608	182	235	280	652	1269	155	56	401	168	721	4	6629
Apprch %	12.1	74.4	9.5	4	46.6	13.9	18	21.5	30.6	59.5	7.3	2.6	31	13	55.7	0.3	
Total %	3.5	21.3	2.7	1.1	9.2	2.7	3.5	4.2	9.8	19.1	2.3	0.8	6	2.5	10.9	0.1	

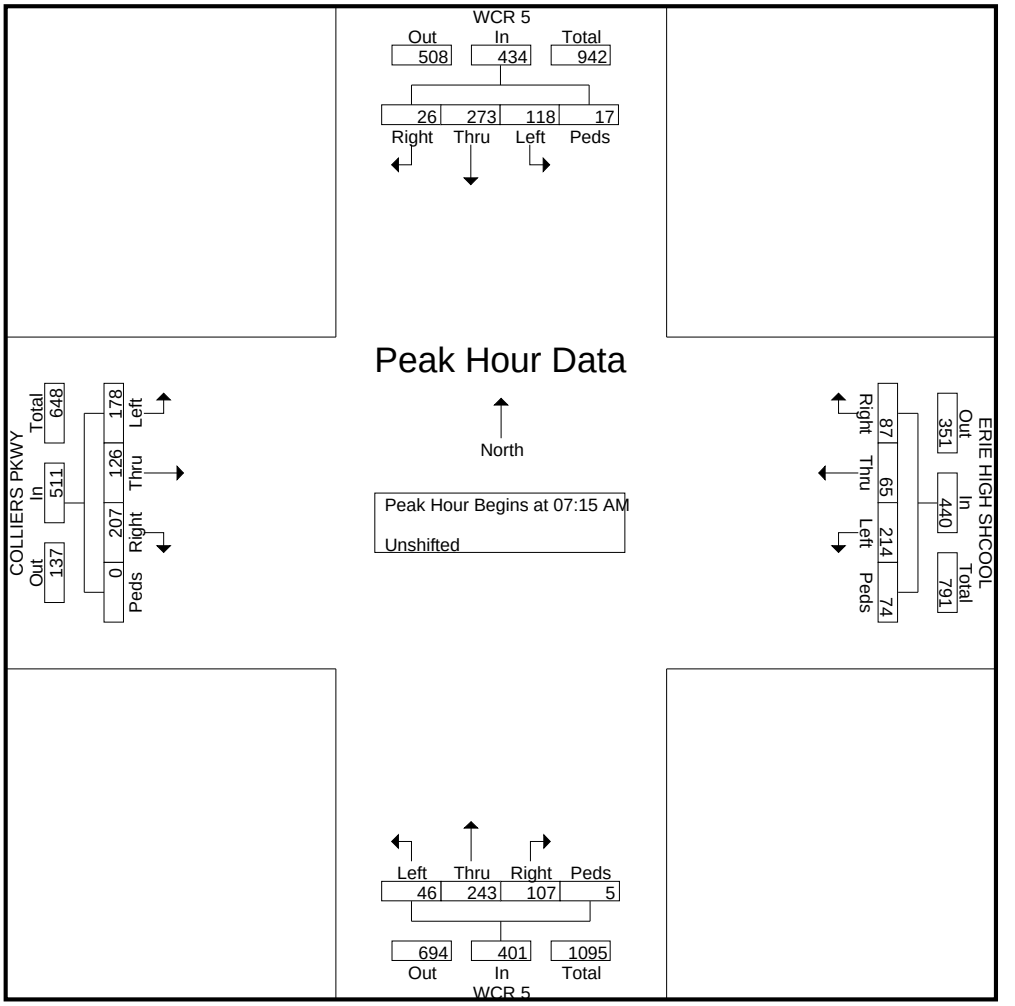
COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

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

File Name : WCR 5 COLLIER'S PKWY
Site Code : 00000025
Start Date : 2/4/2025
Page No : 2

	WCR 5 SOUTHBOUND					ERIE HIGH SHCOOL WESTBOUND					WCR 5 NORTHBOUND					COLLIERS PKWY 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 Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	36	40	1	4	81	52	17	12	12	93	2	52	13	0	67	37	35	57	0	129	370
07:30 AM	**68**	73	1	5	**147**	**92**	**23**	**48**	21	**184**	17	51	**79**	1	**148**	19	**76**	**64**	0	**159**	**638**
07:45 AM	8	**81**	1	2	92	59	14	20	9	102	**18**	63	14	0	95	21	13	48	0	82	371
08:00 AM	6	79	**23**	**6**	114	11	11	7	**32**	61	9	**77**	1	**4**	91	**101**	2	38	0	141	407
Total Volume	118	273	26	17	434	214	65	87	74	440	46	243	107	5	401	178	126	207	0	511	1786
% App. Total	27.2	62.9	6	3.9		48.6	14.8	19.8	16.8		11.5	60.6	26.7	1.2		34.8	24.7	40.5	0		
PHF	.434	.843	.283	.708	.738	.582	.707	.453	.578	.598	.639	.789	.339	.313	.677	.441	.414	.809	.000	.803	.700



COUNTER MEASURES INC

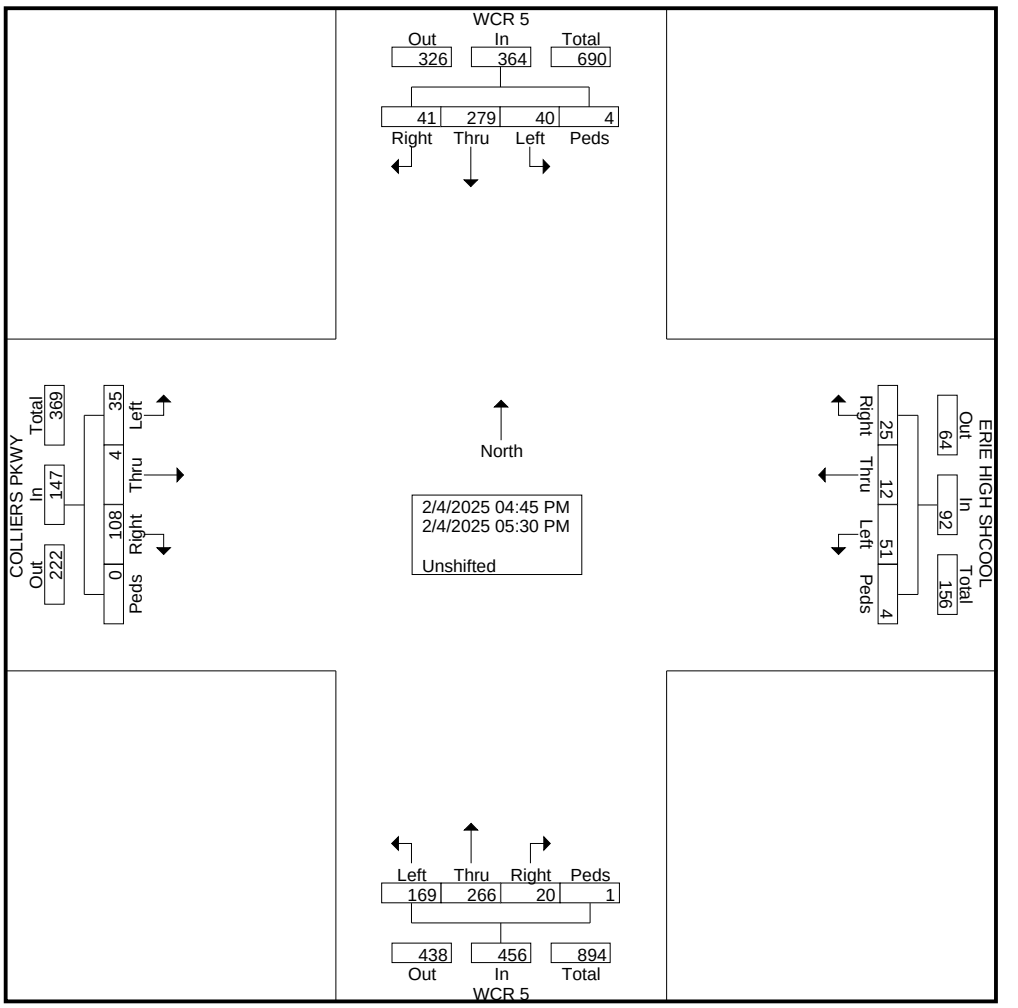
1889 YORK ST
DENVER COLORADO
303-333-7409

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

File Name : wcr 5 collier's pkwy
Site Code : 00000025
Start Date : 2/4/2025
Page No : 1

Groups Printed- Unshifted

	WCR 5 SOUTHBOUND				ERIE HIGH SHCOOL WESTBOUND				WCR 5 NORTHBOUND				COLLIERS PKWY EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
04:45 PM	3	76	8	2	4	1	3	0	40	72	0	0	11	0	21	0	241
Total	3	76	8	2	4	1	3	0	40	72	0	0	11	0	21	0	241
05:00 PM	1	69	14	2	15	3	9	3	52	61	2	0	4	0	23	0	258
05:15 PM	20	74	11	0	14	6	12	0	39	68	8	0	6	3	25	0	286
05:30 PM	16	60	8	0	18	2	1	1	38	65	10	1	14	1	39	0	274
Grand Total	40	279	41	4	51	12	25	4	169	266	20	1	35	4	108	0	1059
Apprch %	11	76.6	11.3	1.1	55.4	13	27.2	4.3	37.1	58.3	4.4	0.2	23.8	2.7	73.5	0	
Total %	3.8	26.3	3.9	0.4	4.8	1.1	2.4	0.4	16	25.1	1.9	0.1	3.3	0.4	10.2	0	



COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: WELD CR 5
E/W STREET: ERIE HIGH NORTH LOT
CITY: ERIE
COUNTY: WELD

File Name : WCR 5 NORTH HIGH SHOOL LOT
Site Code : 00000016
Start Date : 2/5/2025
Page No : 1

Groups Printed- Unshifted

	WCR 5 SOUTHBOUND				ERIE HIGH SHCOOL NORTH WESTBOUND				WCR 5 NORTHBOUND				NO ACCESS EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	1	1	0	0	0	0	0	0	0	1	4	0	0	0	0	0	7
06:45 AM	2	0	0	0	0	0	2	0	0	0	4	0	0	0	0	0	8
Total	3	1	0	0	0	0	2	0	0	1	8	0	0	0	0	0	15
07:00 AM	8	1	0	0	1	0	0	0	0	0	9	0	0	0	0	0	19
07:15 AM	16	0	0	0	1	0	1	0	0	0	18	0	0	0	0	0	36
07:30 AM	12	0	0	0	1	0	2	0	0	0	7	0	0	0	0	0	22
07:45 AM	10	0	0	1	1	0	2	0	0	0	15	0	0	0	0	0	29
Total	46	1	0	1	4	0	5	0	0	0	49	0	0	0	0	0	106
08:00 AM	4	0	0	0	0	0	0	0	0	3	5	0	0	0	0	0	12
08:15 AM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	5	0	0	1	0	0	0	0	0	3	5	0	0	0	0	0	14
02:30 PM	9	0	0	2	14	0	5	0	0	1	13	0	0	0	0	0	44
02:45 PM	12	0	0	2	47	0	51	0	0	0	19	12	0	0	0	0	143
Total	21	0	0	4	61	0	56	0	0	1	32	12	0	0	0	0	187
03:00 PM	12	0	0	1	6	0	22	0	0	0	23	4	0	0	0	0	68
03:15 PM	63	0	0	0	4	0	6	0	0	1	15	66	0	0	0	0	155
03:30 PM	15	0	0	2	43	0	56	0	0	0	9	78	0	0	0	0	203
03:45 PM	2	0	0	0	11	0	7	0	0	0	1	1	0	0	0	0	22
Total	92	0	0	3	64	0	91	0	0	1	48	149	0	0	0	0	448
04:00 PM	3	0	0	0	10	0	6	0	0	0	8	2	0	0	0	0	29
04:15 PM	4	0	0	0	6	0	6	0	0	0	9	1	0	0	0	3	29
04:30 PM	3	0	0	0	13	0	5	0	0	0	8	4	0	0	0	0	33
04:45 PM	3	0	0	0	6	0	10	0	0	0	12	5	0	0	0	0	36
Total	13	0	0	0	35	0	27	0	0	0	37	12	0	0	0	3	127
05:00 PM	5	0	0	1	23	0	4	0	0	3	13	6	0	0	0	0	55
05:15 PM	2	0	0	0	13	0	5	0	0	0	10	1	0	0	0	0	31
05:30 PM	3	0	0	0	6	0	1	0	0	0	7	0	0	0	0	0	17
05:45 PM	5	2	0	0	14	0	8	0	0	0	10	0	0	0	0	0	39
Total	15	2	0	1	56	0	18	0	0	3	40	7	0	0	0	0	142
Grand Total	195	4	0	10	220	0	199	0	0	9	219	180	0	0	0	3	1039
Apprch %	93.3	1.9	0	4.8	52.5	0	47.5	0	0	2.2	53.7	44.1	0	0	0	100	
Total %	18.8	0.4	0	1	21.2	0	19.2	0	0	0.9	21.1	17.3	0	0	0	0.3	

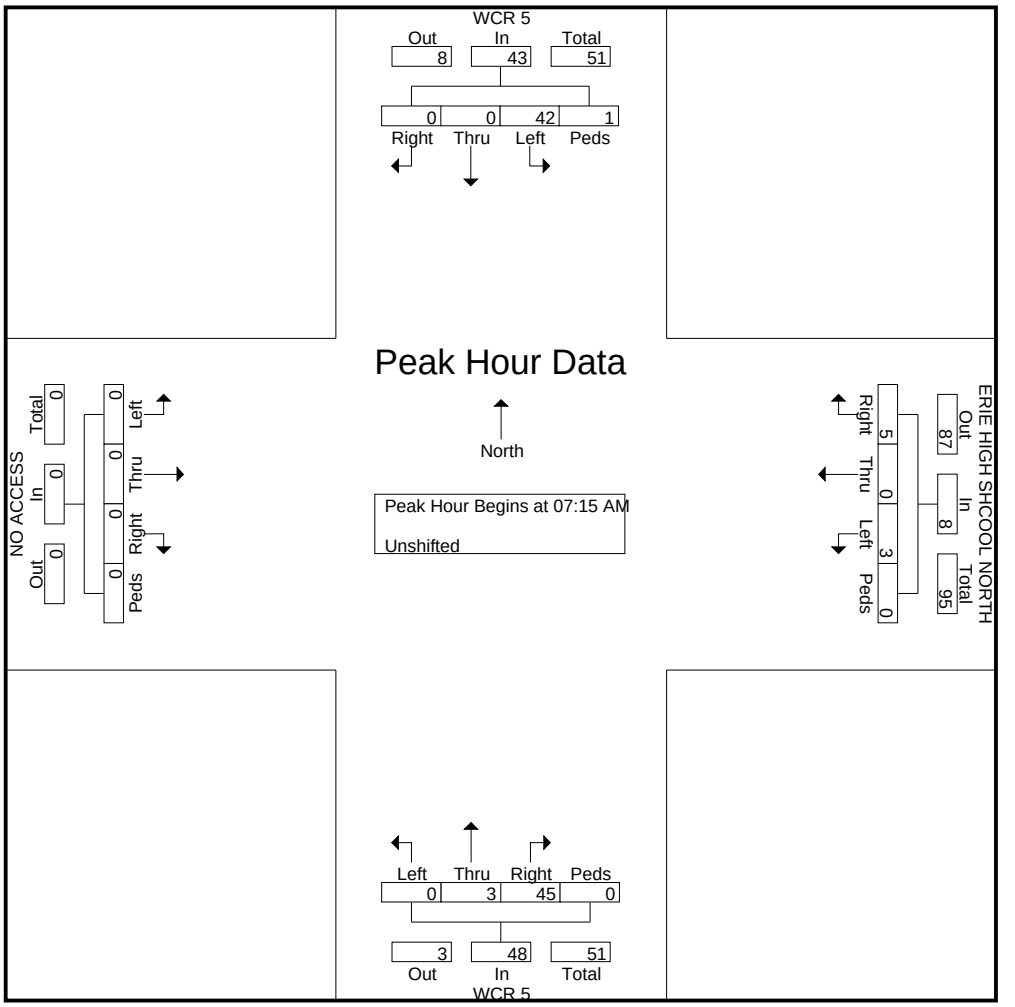
COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: WELD CR 5
E/W STREET: ERIE HIGH NORTH LOT
CITY: ERIE
COUNTY: WELD

File Name : WCR 5 NORTH HIGH SHOOL LOT
Site Code : 00000016
Start Date : 2/5/2025
Page No : 2

	WCR 5 SOUTHBOUND					ERIE HIGH SHCOOL NORTH WESTBOUND					WCR 5 NORTHBOUND					NO ACCESS 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 Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	**16**	0	0	0	**16**	**1**	0	1	0	2	0	0	**18**	0	**18**	0	0	0	0	0	**36**
07:30 AM	12	0	0	0	12	1	0	**2**	0	**3**	0	0	7	0	7	0	0	0	0	0	22
07:45 AM	10	0	0	**1**	11	1	0	2	0	3	0	0	15	0	15	0	0	0	0	0	29
08:00 AM	4	0	0	0	4	0	0	0	0	0	0	**3**	5	0	8	0	0	0	0	0	12
Total Volume	42	0	0	1	43	3	0	5	0	8	0	3	45	0	48	0	0	0	0	0	99
% App. Total	97.7	0	0	2.3		37.5	0	62.5	0		0	6.2	93.8	0		0	0	0	0		
PHF	.656	.000	.000	.250	.672	.750	.000	.625	.000	.667	.000	.250	.625	.000	.667	.000	.000	.000	.000	.000	.688



COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: WELD CR 5
E/W STREET: ERIE HIGH SCHOOL LOT
CITY: ERIE
COUNTY: WELD

File Name : WCR 5 SOUTH ERIE LOT
Site Code : 00000015
Start Date : 2/4/2025
Page No : 1

Groups Printed- Unshifted

	WCR 5 SOUTHBOUND				ERIE HIGH SCHOOL LOT WESTBOUND				WCR 5 NORTHBOUND				APARTMENT COMPLEX EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	1	0	0	0	0	0	0	0	0	0	8	0	2	0	15	0	26
06:45 AM	2	0	1	0	0	0	0	0	0	0	11	0	1	0	13	0	28
Total	3	0	1	0	0	0	0	0	0	0	19	0	3	0	28	0	54
07:00 AM	6	0	1	0	6	0	5	0	1	0	25	0	0	0	13	0	57
07:15 AM	36	0	1	0	1	0	3	0	0	0	126	1	0	0	13	0	181
07:30 AM	54	0	1	0	0	0	27	0	0	0	147	0	0	0	14	0	243
07:45 AM	6	0	1	0	0	0	5	0	1	0	29	0	0	0	13	0	55
Total	102	0	4	0	7	0	40	0	2	0	327	1	0	0	53	0	536
08:00 AM	4	0	0	5	2	0	2	0	0	0	17	0	0	0	9	0	39
08:15 AM	4	0	4	0	0	0	1	0	1	0	6	0	0	0	10	0	26
Total	8	0	4	5	2	0	3	0	1	0	23	0	0	0	19	0	65
02:30 PM	4	0	0	0	3	0	13	0	1	0	8	2	0	0	0	0	31
02:45 PM	12	0	3	0	20	0	111	0	0	0	51	0	0	0	18	0	215
Total	16	0	3	0	23	0	124	0	1	0	59	2	0	0	18	0	246
03:00 PM	3	0	0	0	9	0	6	0	1	0	30	0	0	0	1	0	50
03:15 PM	13	0	2	0	5	0	7	0	0	0	23	0	0	0	4	0	54
03:30 PM	5	0	2	5	5	0	12	0	0	0	13	2	0	0	4	0	48
03:45 PM	1	0	3	0	1	0	0	0	2	0	8	0	0	0	11	0	26
Total	22	0	7	5	20	0	25	0	3	0	74	2	0	0	20	0	178
04:00 PM	3	0	1	0	10	0	5	0	1	0	7	0	0	0	4	0	31
04:15 PM	0	0	3	0	3	0	1	0	3	0	5	0	0	0	8	0	23
04:30 PM	1	0	0	0	0	0	0	0	4	0	7	0	0	0	4	0	16
04:45 PM	5	0	2	0	0	0	1	0	2	0	17	0	0	0	4	0	31
Total	9	0	6	0	13	0	7	0	10	0	36	0	0	0	20	0	101
05:00 PM	5	0	1	0	6	0	0	1	3	0	17	0	0	0	10	0	43
05:15 PM	3	0	3	0	5	0	1	0	1	0	67	0	0	0	9	0	89
05:30 PM	5	0	4	0	3	0	1	0	2	0	91	0	1	0	6	0	113
05:45 PM	4	0	1	0	1	0	0	0	7	0	42	0	0	0	7	0	62
Total	17	0	9	0	15	0	2	1	13	0	217	0	1	0	32	0	307
Grand Total	177	0	34	10	80	0	201	1	30	0	755	5	4	0	190	0	1487
Apprch %	80.1	0	15.4	4.5	28.4	0	71.3	0.4	3.8	0	95.6	0.6	2.1	0	97.9	0	
Total %	11.9	0	2.3	0.7	5.4	0	13.5	0.1	2	0	50.8	0.3	0.3	0	12.8	0	

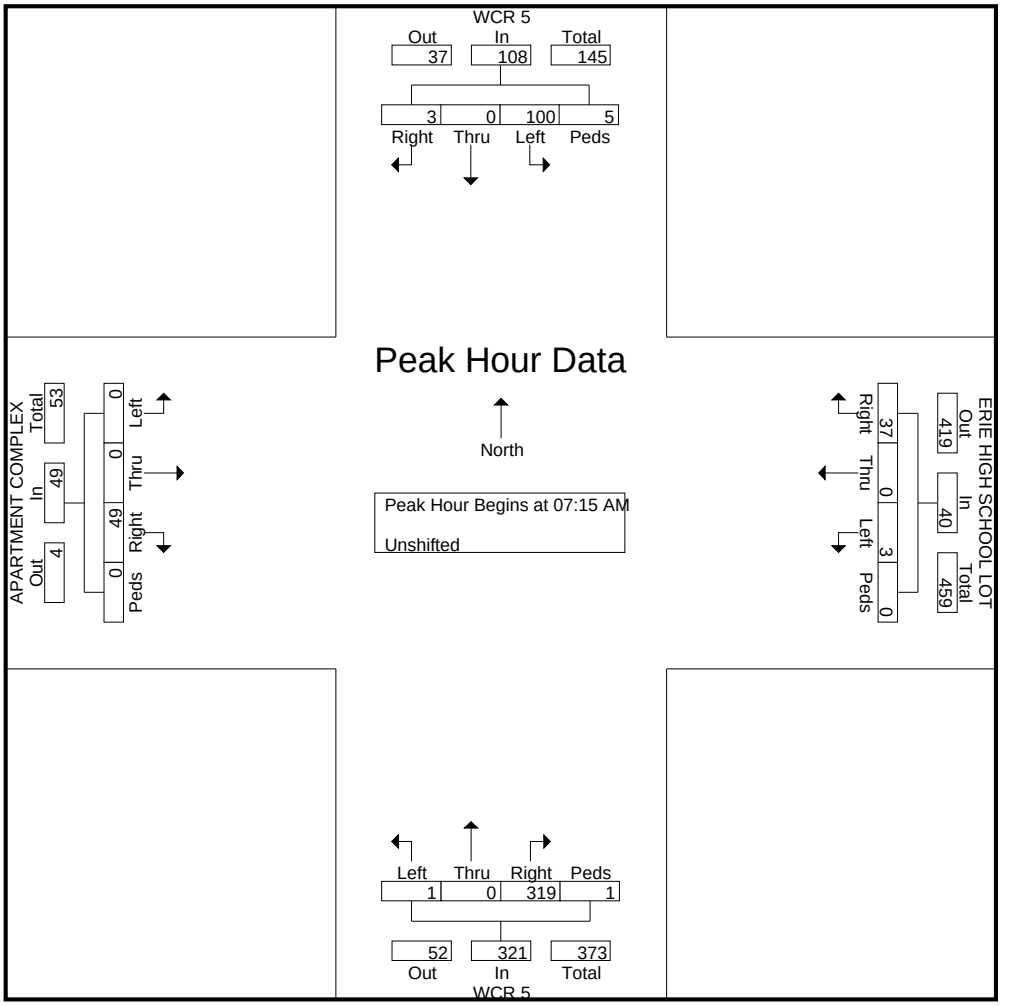
COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: WELD CR 5
E/W STREET: ERIE HIGH SCHOOL LOT
CITY: ERIE
COUNTY: WELD

File Name : WCR 5 SOUTH ERIE LOT
Site Code : 00000015
Start Date : 2/4/2025
Page No : 2

	WCR 5 SOUTHBOUND					ERIE HIGH SCHOOL LOT WESTBOUND					WCR 5 NORTHBOUND					APARTMENT COMPLEX 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 Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	36	0	**1**	0	37	1	0	3	0	4	0	0	126	**1**	127	0	0	13	0	13	181
07:30 AM	**54**	0	1	0	**55**	0	0	**27**	0	**27**	0	0	**147**	0	**147**	0	0	**14**	0	**14**	**243**
07:45 AM	6	0	1	0	7	0	0	5	0	5	**1**	0	29	0	30	0	0	13	0	13	55
08:00 AM	4	0	0	**5**	9	**2**	0	2	0	4	0	0	17	0	17	0	0	9	0	9	39
Total Volume	100	0	3	5	108	3	0	37	0	40	1	0	319	1	321	0	0	49	0	49	518
% App. Total	92.6	0	2.8	4.6		7.5	0	92.5	0		0.3	0	99.4	0.3		0	0	100	0		
PHF	.463	.000	.750	.250	.491	.375	.000	.343	.000	.370	.250	.000	.543	.250	.546	.000	.000	.875	.000	.875	.533



COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: CR 5
E/W STREET: CR 10
CITY: ERIE
COUNTY: BOULDER

File Name : CR5CR1024
Site Code : 00000005
Start Date : 10/2/2024
Page No : 1

Groups Printed- VEHICLES

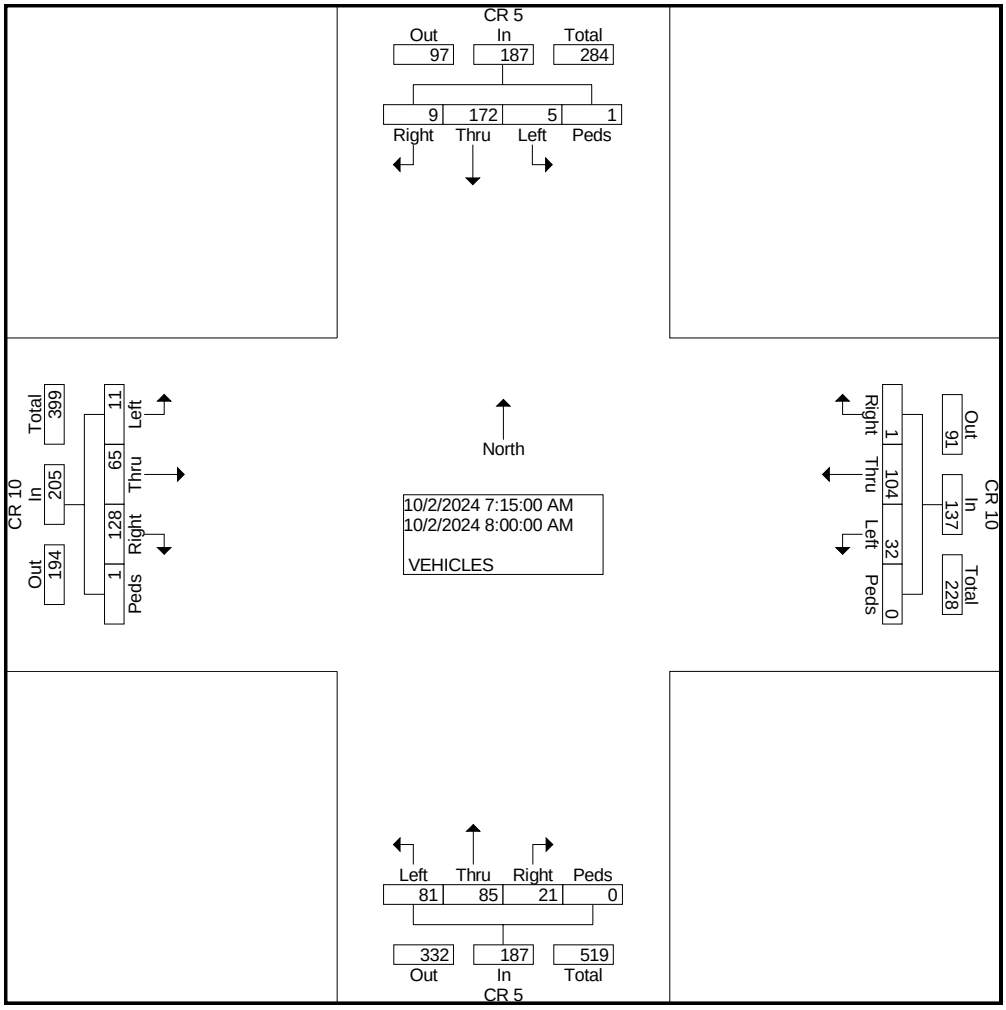
	CR 5 Southbound				CR 10 Westbound				CR 5 Northbound				CR 10 Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	1	19	0	1	0	9	0	0	2	11	0	0	3	12	3	0	61
06:45 AM	2	23	0	2	1	13	6	0	7	7	2	0	3	7	3	0	76
Total	3	42	0	3	1	22	6	0	9	18	2	0	6	19	6	0	137
07:00 AM	4	31	3	0	3	8	0	1	6	7	2	0	2	13	8	0	88
07:15 AM	1	59	3	0	10	19	0	0	14	13	1	0	2	18	31	0	171
07:30 AM	1	51	2	0	9	31	0	0	25	31	5	0	5	18	47	0	225
07:45 AM	2	26	2	0	5	24	0	0	20	14	6	0	1	14	19	0	133
Total	8	167	10	0	27	82	0	1	65	65	14	0	10	63	105	0	617
08:00 AM	1	36	2	1	8	30	1	0	22	27	9	0	3	15	31	1	187
08:15 AM	1	21	5	0	5	20	0	0	25	27	8	0	1	16	15	0	144
Total	2	57	7	1	13	50	1	0	47	54	17	0	4	31	46	1	331
04:00 PM	4	25	5	0	7	11	1	0	22	21	4	0	6	21	8	0	135
04:15 PM	3	21	1	0	1	12	3	0	10	18	3	0	5	27	8	0	112
04:30 PM	3	29	6	0	3	12	5	0	20	22	5	0	3	19	7	0	134
04:45 PM	5	35	4	0	2	16	0	0	22	20	6	0	2	30	12	0	154
Total	15	110	16	0	13	51	9	0	74	81	18	0	16	97	35	0	535
05:00 PM	3	29	3	1	4	19	4	0	11	25	6	0	1	28	10	0	144
05:15 PM	1	31	4	1	5	16	1	0	22	31	1	0	1	29	15	0	158
05:30 PM	0	38	6	0	1	13	3	0	25	34	8	0	3	24	10	0	165
05:45 PM	5	18	4	0	0	14	0	0	8	28	6	0	0	21	11	0	115
Total	9	116	17	2	10	62	8	0	66	118	21	0	5	102	46	0	582
Grand Total	37	492	50	6	64	267	24	1	261	336	72	0	41	312	238	1	2202
Apprch %	6.3	84.1	8.5	1.0	18.0	75.0	6.7	0.3	39.0	50.2	10.8	0.0	6.9	52.7	40.2	0.2	
Total %	1.7	22.3	2.3	0.3	2.9	12.1	1.1	0.0	11.9	15.3	3.3	0.0	1.9	14.2	10.8	0.0	

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

N/S STREET: CR 5
E/W STREET: CR 10
CITY: ERIE
COUNTY: BOULDER

File Name : CR5CR1024
Site Code : 00000005
Start Date : 10/2/2024

	CR 5 Southbound					CR 10 Westbound					CR 5 Northbound					CR 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 07:15 AM to 08:00 AM - Peak 1 of 1																					
Intersection	07:15 AM																				
Volume	5	172	9	1	187	32	104	1	0	137	81	85	21	0	187	11	65	128	1	205	716
Percent	2.7	92.0	4.8	0.5		23.4	75.9	0.7	0.0		43.3	45.5	11.2	0.0		5.4	31.7	62.4	0.5		
07:30 Volume	1	51	2	0	54	9	31	0	0	40	25	31	5	0	61	5	18	47	0	70	225
Peak Factor																					0.796
High Int.	07:15 AM					07:30 AM					07:30 AM					07:30 AM					
Volume	1	59	3	0	63	9	31	0	0	40	25	31	5	0	61	5	18	47	0	70	
Peak Factor					0.742					0.856					0.766					0.732	

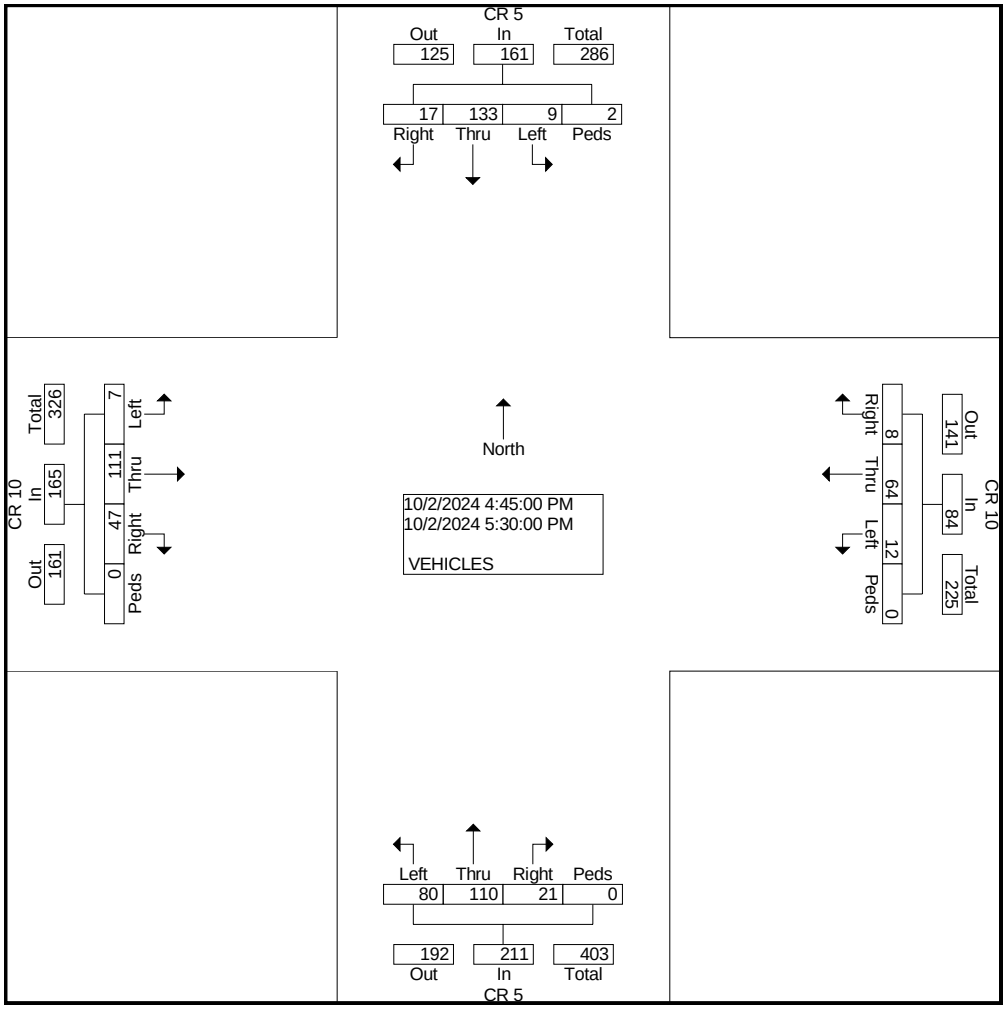


COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: CR 5
E/W STREET: CR 10
CITY: ERIE
COUNTY: BOULDER

File Name : CR5CR1024
Site Code : 00000005
Start Date : 10/2/2024

	CR 5 Southbound					CR 10 Westbound					CR 5 Northbound					CR 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 04:45 PM to 05:30 PM - Peak 1 of 1																					
Intersection	04:45 PM																				
Volume	9	133	17	2	161	12	64	8	0	84	80	110	21	0	211	7	111	47	0	165	621
Percent	5.6	82.6	10.6	1.2		14.3	76.2	9.5	0.0		37.9	52.1	10.0	0.0		4.2	67.3	28.5	0.0		
05:30 Volume	0	38	6	0	44	1	13	3	0	17	25	34	8	0	67	3	24	10	0	37	165
Peak Factor																					0.941
High Int.	04:45 PM					05:00 PM					05:30 PM					05:15 PM					
Volume	5	35	4	0	44	4	19	4	0	27	25	34	8	0	67	1	29	15	0	45	
Peak Factor					0.915					0.778					0.787					0.917	



COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: CR 7
E/W STREET: CR 10
CITY: ERIE
COUNTY: BOULDER

File Name : CR7CR1024
Site Code : 00000016
Start Date : 10/2/2024
Page No : 1

Groups Printed- VEHICLES

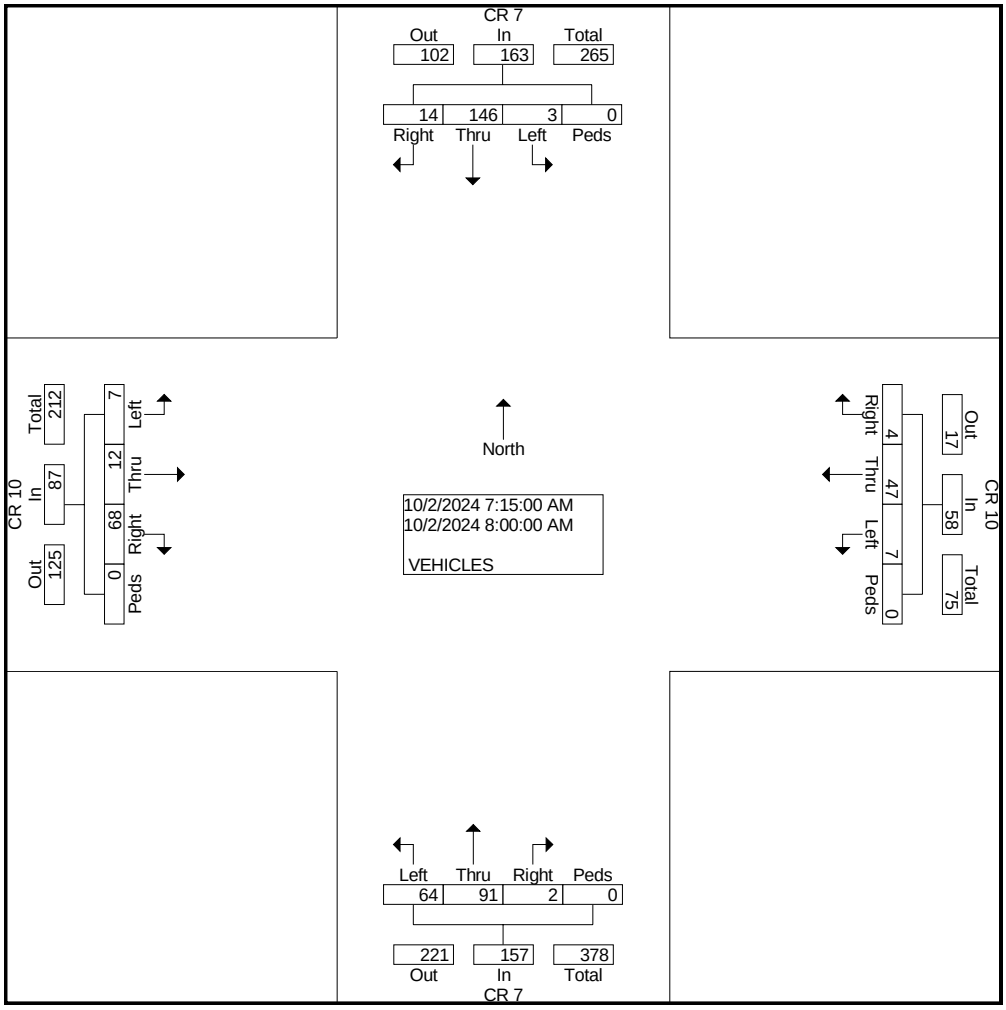
	CR 7 Southbound				CR 10 Westbound				CR 7 Northbound				CR 10 Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	1	15	2	0	0	1	0	0	9	16	0	0	1	1	13	0	59
06:45 AM	1	19	1	0	1	4	0	0	16	27	0	0	2	3	9	0	83
Total	2	34	3	0	1	5	0	0	25	43	0	0	3	4	22	0	142
07:00 AM	1	20	3	0	0	0	0	0	10	21	0	0	1	1	9	0	66
07:15 AM	0	38	1	0	0	10	0	0	18	28	1	0	0	4	15	0	115
07:30 AM	1	33	6	0	0	12	3	0	14	27	1	0	2	2	18	0	119
07:45 AM	0	36	3	0	3	12	0	0	14	20	0	0	3	2	18	0	111
Total	2	127	13	0	3	34	3	0	56	96	2	0	6	9	60	0	411
08:00 AM	2	39	4	0	4	13	1	0	18	16	0	0	2	4	17	0	120
08:15 AM	0	24	0	0	1	12	1	0	9	23	0	0	6	8	13	0	97
Total	2	63	4	0	5	25	2	0	27	39	0	0	8	12	30	0	217
04:00 PM	0	51	3	0	0	1	0	0	13	37	0	0	5	7	24	0	141
04:15 PM	0	48	1	0	0	5	1	0	11	31	3	0	1	4	29	0	134
04:30 PM	1	61	1	0	0	3	1	0	13	28	1	0	3	4	18	0	134
04:45 PM	2	68	4	0	3	2	2	0	14	51	1	0	5	7	24	0	183
Total	3	228	9	0	3	11	4	0	51	147	5	0	14	22	95	0	592
05:00 PM	1	66	4	0	0	6	2	0	14	38	1	0	6	10	29	0	177
05:15 PM	0	53	1	0	3	7	0	0	15	46	1	0	1	5	27	0	159
05:30 PM	0	36	0	0	2	1	1	0	13	42	1	0	6	4	18	0	124
05:45 PM	1	35	4	0	1	1	1	0	14	31	2	0	6	4	19	0	119
Total	2	190	9	0	6	15	4	0	56	157	5	0	19	23	93	0	579
Grand Total	11	642	38	0	18	90	13	0	215	482	12	0	50	70	300	0	1941
Apprch %	1.6	92.9	5.5	0.0	14.9	74.4	10.7	0.0	30.3	68.0	1.7	0.0	11.9	16.7	71.4	0.0	
Total %	0.6	33.1	2.0	0.0	0.9	4.6	0.7	0.0	11.1	24.8	0.6	0.0	2.6	3.6	15.5	0.0	

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

N/S STREET: CR 7
E/W STREET: CR 10
CITY: ERIE
COUNTY: BOULDER

File Name : CR7CR1024
Site Code : 00000016
Start Date : 10/2/2024
Page No : 2

	CR 7 Southbound					CR 10 Westbound					CR 7 Northbound					CR 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 07:15 AM to 08:00 AM - Peak 1 of 1																					
Intersection	07:15 AM																				
Volume	3	146	14	0	163	7	47	4	0	58	64	91	2	0	157	7	12	68	0	87	465
Percent	1.8	89.6	8.6	0.0		12.1	81.0	6.9	0.0		40.8	58.0	1.3	0.0		8.0	13.8	78.2	0.0		
08:00 Volume	2	39	4	0	45	4	13	1	0	18	18	16	0	0	34	2	4	17	0	23	120
Peak Factor																					0.969
High Int.	08:00 AM					08:00 AM					07:15 AM					07:45 AM					
Volume	2	39	4	0	45	4	13	1	0	18	18	28	1	0	47	3	2	18	0	23	
Peak Factor					0.906					0.806					0.835					0.946	

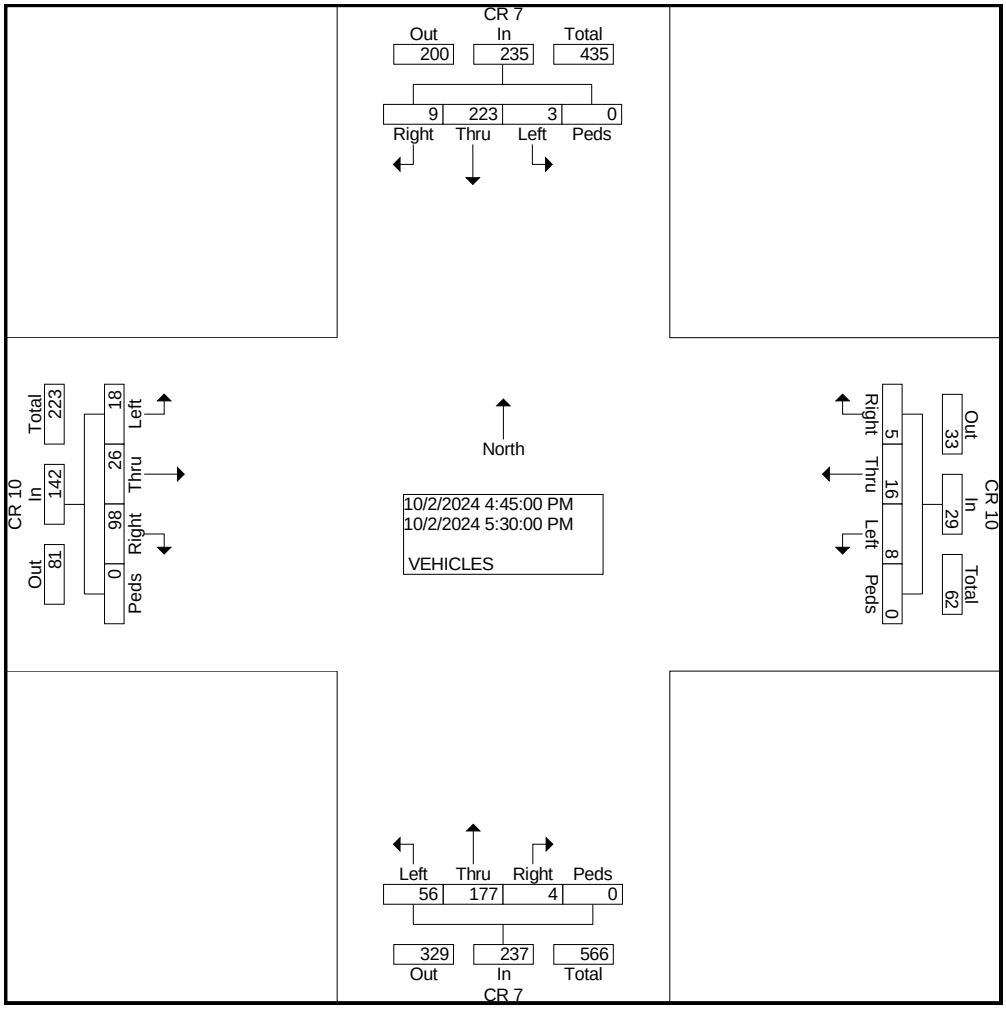


COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: CR 7
E/W STREET: CR 10
CITY: ERIE
COUNTY: BOULDER

File Name : CR7CR1024
Site Code : 00000016
Start Date : 10/2/2024
Page No : 3

	CR 7 Southbound					CR 10 Westbound					CR 7 Northbound					CR 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 04:45 PM to 05:30 PM - Peak 1 of 1																					
Intersection	04:45 PM																				
Volume	3	223	9	0	235	8	16	5	0	29	56	177	4	0	237	18	26	98	0	142	643
Percent	1.3	94.9	3.8	0.0		27.6	55.2	17.2	0.0		23.6	74.7	1.7	0.0		12.7	18.3	69.0	0.0		
04:45 Volume	2	68	4	0	74	3	2	2	0	7	14	51	1	0	66	5	7	24	0	36	183
Peak Factor																					0.878
High Int.	04:45 PM					05:15 PM					04:45 PM					05:00 PM					
Volume	2	68	4	0	74	3	7	0	0	10	14	51	1	0	66	6	10	29	0	45	
Peak Factor					0.794					0.725					0.898					0.789	



COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: CR 5
E/W STREET: ERIE PKWY
CITY: ERIE
COUNTY: BOULDER

File Name : CR5ERIEPKWY24
Site Code : 00000008
Start Date : 10/1/2024
Page No : 1

Groups Printed- VEHICLES

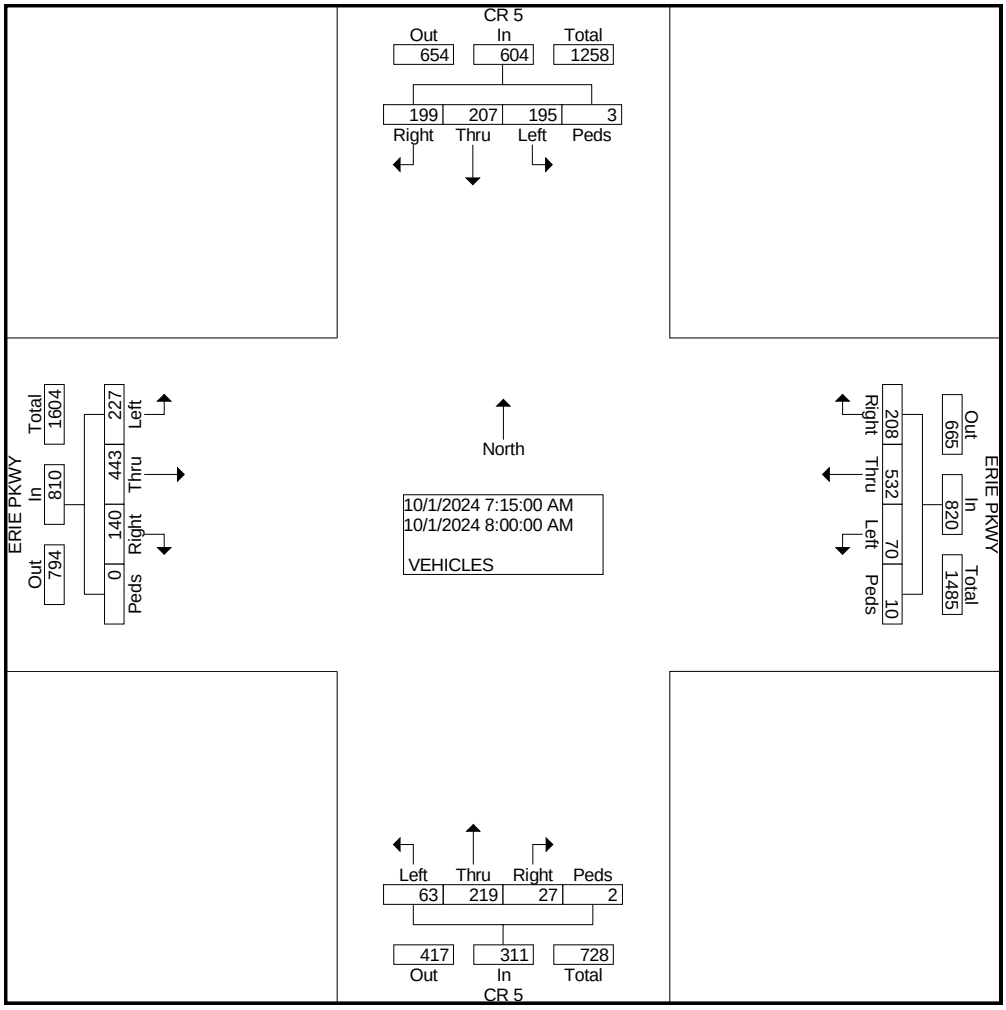
	CR 5 Southbound				ERIE PKWY Westbound				CR 5 Northbound				ERIE PKWY Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	37	13	8	0	13	100	22	0	4	11	3	0	12	79	11	1	314
06:45 AM	34	8	14	1	14	91	21	0	13	6	4	0	8	85	16	0	315
Total	71	21	22	1	27	191	43	0	17	17	7	0	20	164	27	1	629
07:00 AM	52	15	19	0	17	108	31	1	19	20	5	1	20	109	12	0	429
07:15 AM	51	35	42	0	20	115	71	2	9	69	6	1	70	107	15	0	613
07:30 AM	55	76	68	3	21	122	54	5	17	102	4	0	63	110	31	0	731
07:45 AM	34	39	36	0	19	158	37	1	22	21	8	1	39	111	52	0	578
Total	192	165	165	3	77	503	193	9	67	212	23	3	192	437	110	0	2351
08:00 AM	55	57	53	0	10	137	46	2	15	27	9	0	55	115	42	0	623
08:15 AM	54	43	73	1	13	110	15	0	27	29	15	3	18	117	28	0	546
Total	109	100	126	1	23	247	61	2	42	56	24	3	73	232	70	0	1169
04:00 PM	39	36	13	2	3	79	36	2	33	44	17	2	29	152	56	0	543
04:15 PM	28	28	17	2	9	96	42	2	29	51	17	0	45	162	41	0	569
04:30 PM	30	47	22	0	9	100	51	0	49	44	21	0	28	161	40	0	602
04:45 PM	43	36	22	1	4	86	43	0	30	56	15	0	27	161	43	0	567
Total	140	147	74	5	25	361	172	4	141	195	70	2	129	636	180	0	2281
05:00 PM	71	48	24	5	3	109	58	1	27	47	19	1	33	202	40	0	688
05:15 PM	46	51	27	2	5	104	55	0	25	53	14	1	30	183	30	2	628
05:30 PM	48	35	23	2	6	116	56	2	37	58	14	2	27	159	44	2	631
05:45 PM	43	33	31	0	5	100	48	0	25	54	7	0	27	145	24	0	542
Total	208	167	105	9	19	429	217	3	114	212	54	4	117	689	138	4	2489
Grand Total	720	600	492	19	171	1731	686	18	381	692	178	12	531	2158	525	5	8919
Apprch %	39.3	32.8	26.9	1.0	6.6	66.4	26.3	0.7	30.2	54.8	14.1	1.0	16.5	67.0	16.3	0.2	
Total %	8.1	6.7	5.5	0.2	1.9	19.4	7.7	0.2	4.3	7.8	2.0	0.1	6.0	24.2	5.9	0.1	

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

N/S STREET: CR 5
E/W STREET: ERIE PKWY
CITY: ERIE
COUNTY: BOULDER

File Name : CR5ERIEPKWY24
Site Code : 00000008
Start Date : 10/1/2024

	CR 5 Southbound					ERIE PKWY Westbound					CR 5 Northbound					ERIE PKWY 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	07:15 AM																				
Volume	195	207	199	3	604	70	532	208	10	820	63	219	27	2	311	227	443	140	0	810	2545
Percent	32.3	34.3	32.9	0.5		8.5	64.9	25.4	1.2		20.3	70.4	8.7	0.6		28.0	54.7	17.3	0.0		
07:30 Volume	55	76	68	3	202	21	122	54	5	202	17	102	4	0	123	63	110	31	0	204	731
Peak Factor																					0.870
High Int.	07:30 AM					07:45 AM					07:30 AM					08:00 AM					
Volume	55	76	68	3	202	19	158	37	1	215	17	102	4	0	123	55	115	42	0	212	
Peak Factor					0.748					0.953					0.632					0.955	

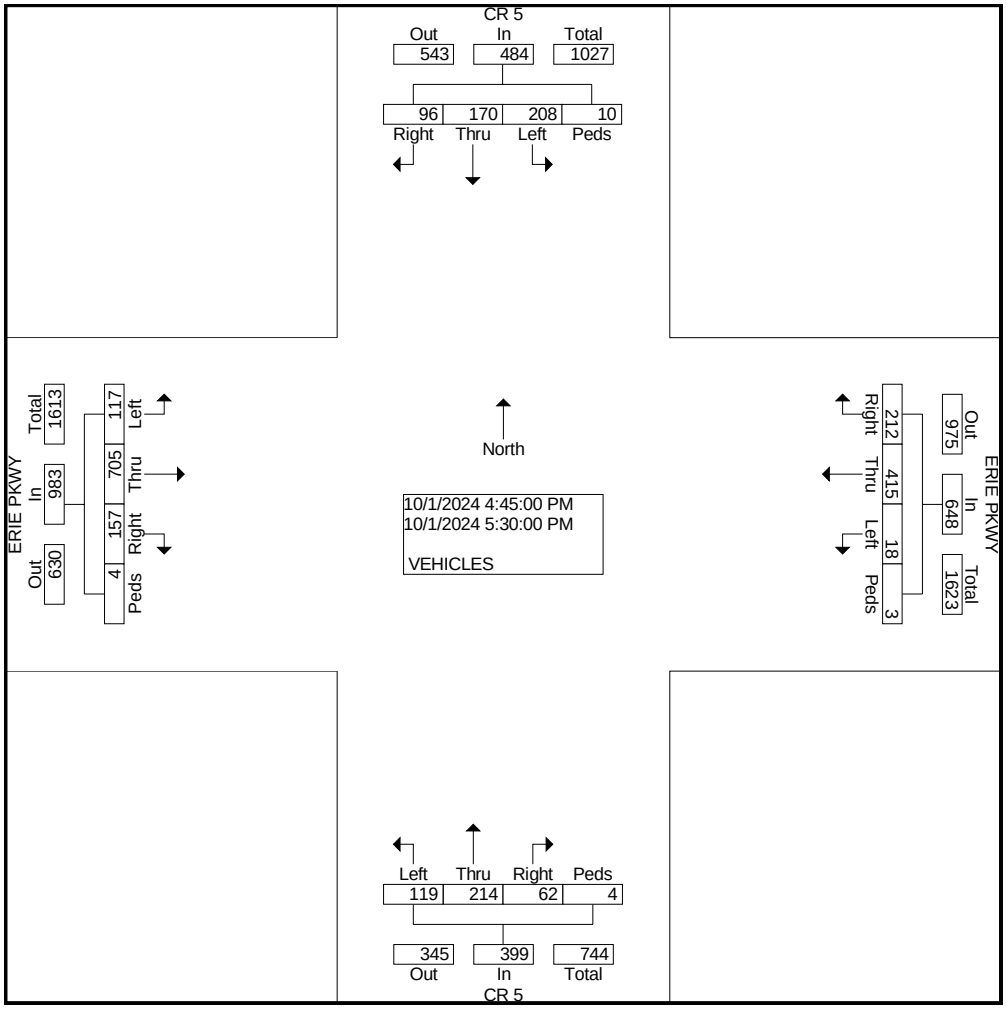


COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: CR 5
E/W STREET: ERIE PKWY
CITY: ERIE
COUNTY: BOULDER

File Name : CR5ERIEPKWY24
Site Code : 00000008
Start Date : 10/1/2024
Page No : 3

	CR 5 Southbound					ERIE PKWY Westbound					CR 5 Northbound					ERIE PKWY 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	04:45 PM																				
Volume	208	170	96	10	484	18	415	212	3	648	119	214	62	4	399	117	705	157	4	983	2514
Percent	43.0	35.1	19.8	2.1		2.8	64.0	32.7	0.5		29.8	53.6	15.5	1.0		11.9	71.7	16.0	0.4		
05:00 Volume	71	48	24	5	148	3	109	58	1	171	27	47	19	1	94	33	202	40	0	275	688
Peak Factor																					0.914
High Int.	05:00 PM					05:30 PM					05:30 PM					05:00 PM					
Volume	71	48	24	5	148	6	116	56	2	180	37	58	14	2	111	33	202	40	0	275	
Peak Factor					0.818					0.900					0.899					0.894	



COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: WESTERLY BLVD
E/W STREET: ERIE PKWY
CITY: ERIE
COUNTY: BOULDER

File Name : WESTERLYERIEPKWY
Site Code : 00000020
Start Date : 10/8/2024
Page No : 1

Groups Printed- VEHICLES

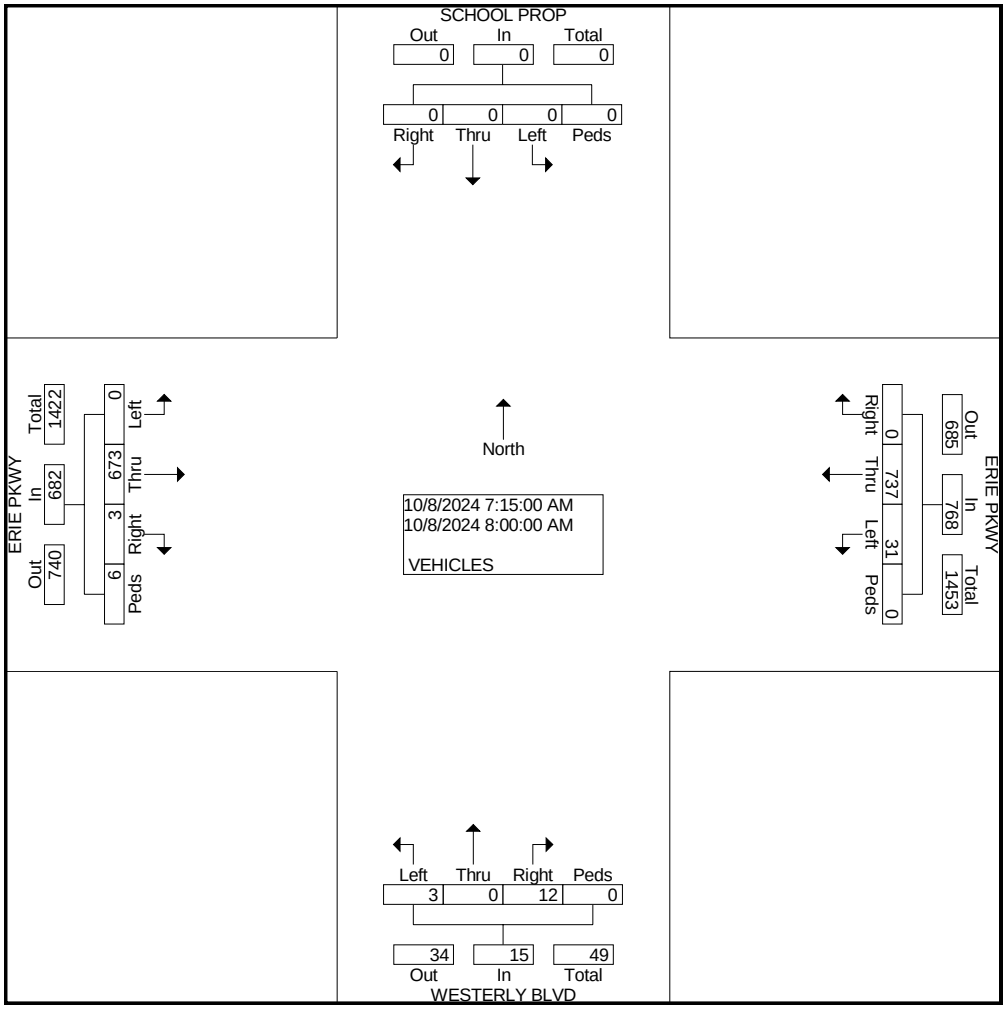
	SCHOOL PROP Southbound				ERIE PKWY Westbound				WESTERLY BLVD Northbound				ERIE PKWY Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	0	0	0	0	7	123	0	0	0	0	0	0	0	98	0	0	228
06:45 AM	0	0	0	0	4	156	0	0	0	0	1	0	0	126	2	0	289
Total	0	0	0	0	11	279	0	0	0	0	1	0	0	224	2	0	517
07:00 AM	0	0	0	0	10	166	0	0	0	0	2	0	0	144	1	0	323
07:15 AM	0	0	0	0	6	176	0	0	0	0	2	0	0	134	2	3	323
07:30 AM	0	0	0	0	9	226	0	0	3	0	5	0	0	190	0	1	434
07:45 AM	0	0	0	0	6	169	0	0	0	0	4	0	0	177	1	1	358
Total	0	0	0	0	31	737	0	0	3	0	13	0	0	645	4	5	1438
08:00 AM	0	0	0	0	10	166	0	0	0	0	1	0	0	172	0	1	350
08:15 AM	0	0	0	0	7	169	1	0	1	0	4	0	0	142	2	1	327
Total	0	0	0	0	17	335	1	0	1	0	5	0	0	314	2	2	677
04:00 PM	0	0	0	0	7	146	0	0	0	0	5	0	0	225	0	0	383
04:15 PM	0	0	0	0	8	173	0	0	1	0	4	0	0	195	2	1	384
04:30 PM	0	0	0	0	2	135	0	0	1	0	1	0	0	190	0	1	330
04:45 PM	0	0	0	0	2	148	0	0	0	0	2	0	0	191	0	3	346
Total	0	0	0	0	19	602	0	0	2	0	12	0	0	801	2	5	1443
05:00 PM	0	0	0	0	3	179	0	0	0	0	8	0	0	229	2	0	421
05:15 PM	0	0	0	0	3	179	0	0	1	0	9	0	0	211	3	1	407
05:30 PM	0	0	0	0	0	183	0	0	0	0	4	0	0	218	2	2	409
05:45 PM	0	0	0	0	2	164	0	0	0	0	0	0	0	159	0	2	327
Total	0	0	0	0	8	705	0	0	1	0	21	0	0	817	7	5	1564
Grand Total	0	0	0	0	86	2658	1	0	7	0	52	0	0	2801	17	17	5639
Apprch %	0.0	0.0	0.0	0.0	3.1	96.8	0.0	0.0	11.9	0.0	88.1	0.0	0.0	98.8	0.6	0.6	
Total %	0.0	0.0	0.0	0.0	1.5	47.1	0.0	0.0	0.1	0.0	0.9	0.0	0.0	49.7	0.3	0.3	

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

N/S STREET: WESTERLY BLVD
E/W STREET: ERIE PKWY
CITY: ERIE
COUNTY: BOULDER

File Name : WESTERLYERIEPKWY
Site Code : 00000020
Start Date : 10/8/2024

	SCHOOL PROP Southbound					ERIE PKWY Westbound					WESTERLY BLVD Northbound					ERIE PKWY 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 07:15 AM to 08:00 AM - Peak 1 of 1																					
Intersection	07:15 AM																				
Volume	0	0	0	0	0	31	737	0	0	768	3	0	12	0	15	0	673	3	6	682	1465
Percent	0.0	0.0	0.0	0.0		4.0	96.0	0.0	0.0		20.0	0.0	80.0	0.0		0.0	98.7	0.4	0.9		
07:30 Volume	0	0	0	0	0	9	226	0	0	235	3	0	5	0	8	0	190	0	1	191	434
Peak Factor																					0.844
High Int.						07:30 AM					07:30 AM					07:30 AM					
Volume	0	0	0	0	0	9	226	0	0	235	3	0	5	0	8	0	190	0	1	191	
Peak Factor										0.817					0.469					0.893	



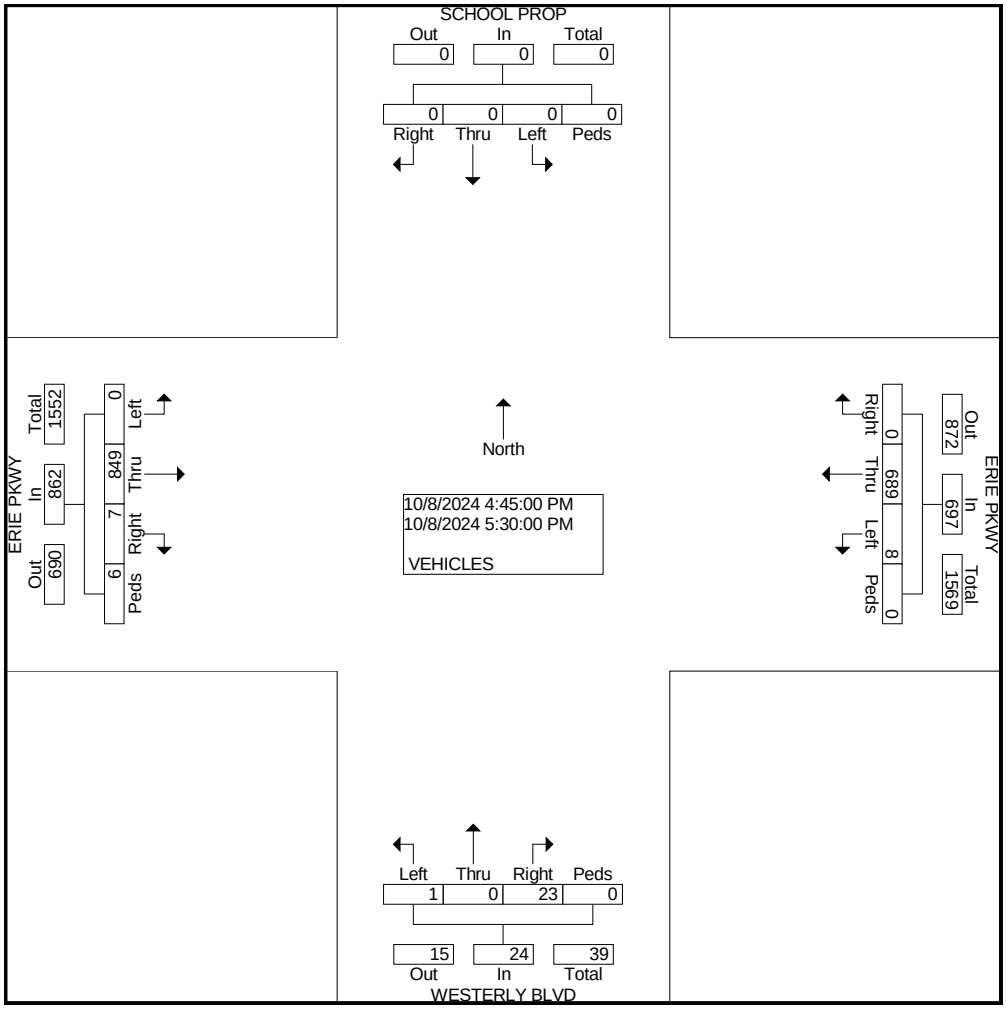
COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: WESTERLY BLVD
E/W STREET: ERIE PKWY
CITY: ERIE
COUNTY: BOULDER

File Name : WESTERLYERIEPKWY
Site Code : 00000020
Start Date : 10/8/2024

	SCHOOL PROP Southbound					ERIE PKWY Westbound					WESTERLY BLVD Northbound					ERIE PKWY 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 04:45 PM to 05:30 PM - Peak 1 of 1																					
Intersection	04:45 PM																				
Volume	0	0	0	0	0	8	689	0	0	697	1	0	23	0	24	0	849	7	6	862	1583
Percent	0.0	0.0	0.0	0.0		1.1	98.9	0.0	0.0		4.2	0.0	95.8	0.0		0.0	98.5	0.8	0.7		
05:00 Volume	0	0	0	0	0	3	179	0	0	182	0	0	8	0	8	0	229	2	0	231	421
Peak Factor																					0.940
High Int.						05:30 PM					05:15 PM					05:00 PM					
Volume	0	0	0	0	0	0	183	0	0	183	1	0	9	0	10	0	229	2	0	231	
Peak Factor										0.952					0.600					0.933	



COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: WATERFORD ST
E/W STREET: ERIE PKWY
CITY: ERIE
COUNTY: BOULDER

File Name : WATERERIEPKWY
Site Code : 00000025
Start Date : 10/8/2024
Page No : 1

Groups Printed- VEHICLES

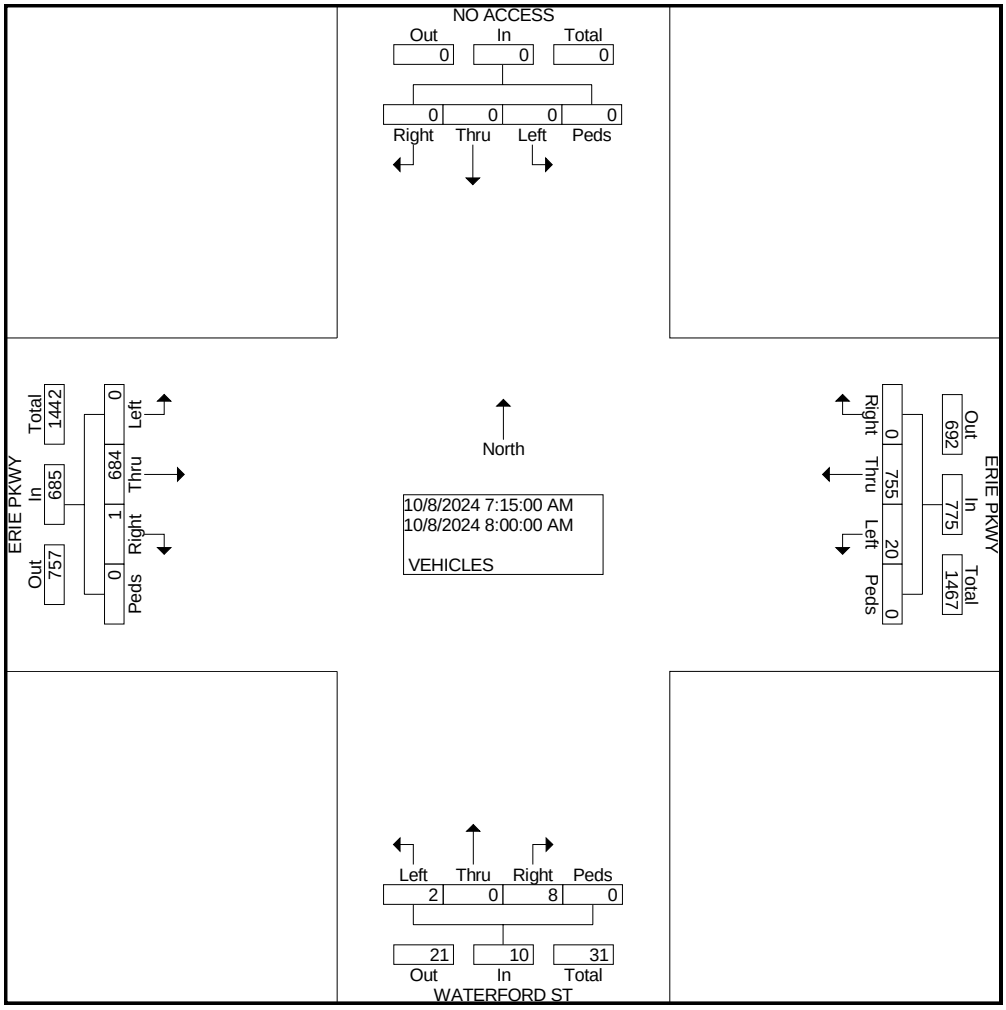
	NO ACCESS Southbound				ERIE PKWY Westbound				WATERFORD ST Northbound				ERIE PKWY Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	0	0	0	0	3	126	0	0	0	0	1	0	0	99	0	0	229
06:45 AM	0	0	0	0	1	156	0	0	0	0	0	0	0	123	0	0	280
Total	0	0	0	0	4	282	0	0	0	0	1	0	0	222	0	0	509
07:00 AM	0	0	0	0	2	179	0	0	0	0	4	0	0	148	0	0	333
07:15 AM	0	0	0	0	6	179	0	0	1	0	2	0	0	137	1	0	326
07:30 AM	0	0	0	0	3	233	0	0	0	0	3	0	0	186	0	0	425
07:45 AM	0	0	0	0	6	178	0	0	0	0	1	0	0	176	0	0	361
Total	0	0	0	0	17	769	0	0	1	0	10	0	0	647	1	0	1445
08:00 AM	0	0	0	0	5	165	0	0	1	0	2	0	0	185	0	0	358
08:15 AM	0	0	0	0	5	184	0	0	0	0	4	0	0	160	0	0	353
Total	0	0	0	0	10	349	0	0	1	0	6	0	0	345	0	0	711
04:00 PM	0	0	0	0	0	142	0	0	0	0	4	0	0	224	1	0	371
04:15 PM	0	0	0	0	3	186	0	0	0	0	5	0	0	204	1	0	399
04:30 PM	0	0	0	0	4	122	0	0	0	0	2	0	0	198	1	0	327
04:45 PM	0	0	0	0	1	164	0	0	0	0	2	0	0	206	0	1	374
Total	0	0	0	0	8	614	0	0	0	0	13	0	0	832	3	1	1471
05:00 PM	0	0	0	0	5	173	0	0	0	0	4	0	0	231	1	0	414
05:15 PM	0	0	0	0	3	171	0	0	1	0	4	0	0	201	1	0	381
05:30 PM	0	0	0	0	3	179	0	0	0	0	2	0	0	224	1	0	409
05:45 PM	0	0	0	0	1	177	0	0	0	0	4	0	0	172	1	0	355
Total	0	0	0	0	12	700	0	0	1	0	14	0	0	828	4	0	1559
Grand Total	0	0	0	0	51	2714	0	0	3	0	44	0	0	2874	8	1	5695
Apprch %	0.0	0.0	0.0	0.0	1.8	98.2	0.0	0.0	6.4	0.0	93.6	0.0	0.0	99.7	0.3	0.0	
Total %	0.0	0.0	0.0	0.0	0.9	47.7	0.0	0.0	0.1	0.0	0.8	0.0	0.0	50.5	0.1	0.0	

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

N/S STREET: WATERFORD ST
E/W STREET: ERIE PKWY
CITY: ERIE
COUNTY: BOULDER

File Name : WATERERIEPKWY
Site Code : 00000025
Start Date : 10/8/2024

	NO ACCESS Southbound					ERIE PKWY Westbound					WATERFORD ST Northbound					ERIE PKWY 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 07:15 AM to 08:00 AM - Peak 1 of 1																					
Intersection	07:15 AM																				
Volume	0	0	0	0	0	20	755	0	0	775	2	0	8	0	10	0	684	1	0	685	1470
Percent	0.0	0.0	0.0	0.0		2.6	97.4	0.0	0.0		20.0	0.0	80.0	0.0		0.0	99.9	0.1	0.0		
07:30 Volume	0	0	0	0	0	3	233	0	0	236	0	0	3	0	3	0	186	0	0	186	425
Peak Factor																					0.865
High Int.						07:30 AM					07:15 AM					07:30 AM					
Volume	0	0	0	0	0	3	233	0	0	236	1	0	2	0	3	0	186	0	0	186	
Peak Factor										0.82					0.83					0.92	
										1					3					1	



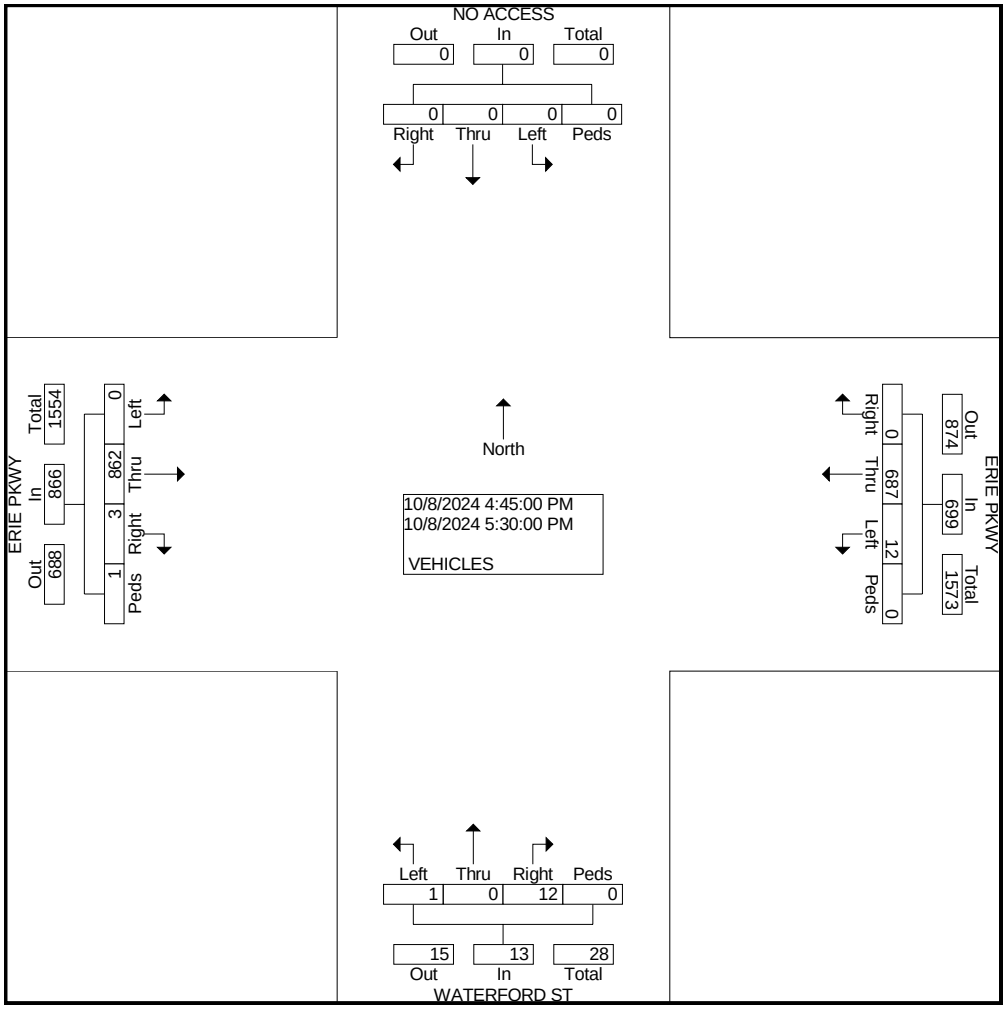
COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: WATERFORD ST
E/W STREET: ERIE PKWY
CITY: ERIE
COUNTY: BOULDER

File Name : WATERERIEPKWY
Site Code : 00000025
Start Date : 10/8/2024
Page No : 3

	NO ACCESS Southbound					ERIE PKWY Westbound					WATERFORD ST Northbound					ERIE PKWY 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 04:45 PM to 05:30 PM - Peak 1 of 1																					
Intersection	04:45 PM																				
Volume	0	0	0	0	0	12	687	0	0	699	1	0	12	0	13	0	862	3	1	866	1578
Percent	0.0	0.0	0.0	0.0		1.7	98.3	0.0	0.0		7.7	0.0	92.3	0.0		0.0	99.5	0.3	0.1		
05:00 Volume	0	0	0	0	0	5	173	0	0	178	0	0	4	0	4	0	231	1	0	232	414
Peak Factor																					0.953
High Int.						05:30 PM					05:15 PM					05:00 PM					
Volume	0	0	0	0	0	3	179	0	0	182	1	0	4	0	5	0	231	1	0	232	
Peak Factor										0.960					0.650					0.933	



COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: CR 7
E/W STREET: ERIE PKWY
CITY: ERIE
COUNTY: BOULDER

File Name : CR7ERIEPKWY
Site Code : 00000015
Start Date : 10/1/2024
Page No : 1

Groups Printed- VEHICLES

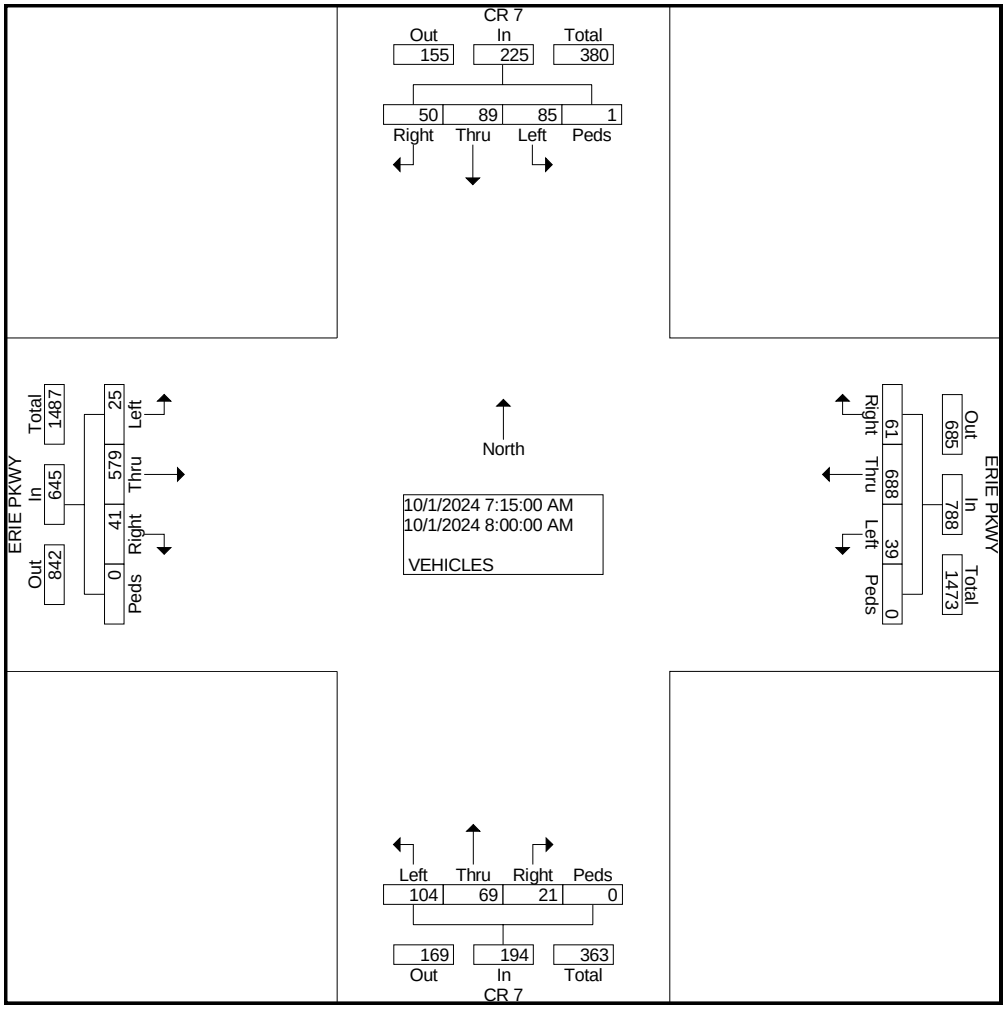
	CR 7 Southbound				ERIE PKWY Westbound				CR 7 Northbound				ERIE PKWY Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	11	9	1	0	8	130	13	0	6	8	1	0	4	102	3	0	296
06:45 AM	9	7	2	0	5	139	13	0	7	13	1	0	1	120	4	0	321
Total	20	16	3	0	13	269	26	0	13	21	2	0	5	222	7	0	617
07:00 AM	18	13	7	0	8	142	12	0	15	20	1	0	2	141	4	0	383
07:15 AM	19	24	9	0	8	176	17	0	30	21	6	0	5	157	3	0	475
07:30 AM	23	17	13	0	9	178	15	0	29	20	2	0	4	139	16	0	465
07:45 AM	26	24	14	1	10	180	12	0	25	17	3	0	8	141	11	0	472
Total	86	78	43	1	35	676	56	0	99	78	12	0	19	578	34	0	1795
08:00 AM	17	24	14	0	12	154	17	0	20	11	10	0	8	142	11	0	440
08:15 AM	13	31	8	0	4	127	13	0	10	16	7	0	4	152	16	0	401
Total	30	55	22	0	16	281	30	0	30	27	17	0	12	294	27	0	841
04:00 PM	13	26	5	0	11	103	13	0	13	29	14	0	12	165	6	0	410
04:15 PM	30	11	9	0	7	131	15	0	25	31	8	0	12	193	26	0	498
04:30 PM	33	28	7	0	4	103	10	0	20	34	11	0	9	171	12	0	442
04:45 PM	34	19	4	0	5	105	19	0	26	40	14	0	12	179	19	0	476
Total	110	84	25	0	27	442	57	0	84	134	47	0	45	708	63	0	1826
05:00 PM	23	16	5	0	7	141	13	1	19	24	12	0	6	197	19	0	483
05:15 PM	31	15	7	0	4	136	14	0	19	40	14	0	6	228	18	0	532
05:30 PM	25	21	7	0	4	143	10	0	22	50	19	0	8	148	24	0	481
05:45 PM	27	23	1	0	9	139	8	0	14	20	12	0	7	169	21	0	450
Total	106	75	20	0	24	559	45	1	74	134	57	0	27	742	82	0	1946
Grand Total	352	308	113	1	115	2227	214	1	300	394	135	0	108	2544	213	0	7025
Apprch %	45.5	39.8	14.6	0.1	4.5	87.1	8.4	0.0	36.2	47.5	16.3	0.0	3.8	88.8	7.4	0.0	
Total %	5.0	4.4	1.6	0.0	1.6	31.7	3.0	0.0	4.3	5.6	1.9	0.0	1.5	36.2	3.0	0.0	

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

N/S STREET: CR 7
E/W STREET: ERIE PKWY
CITY: ERIE
COUNTY: BOULDER

File Name : CR7ERIEPKWY
Site Code : 00000015
Start Date : 10/1/2024

	CR 7 Southbound					ERIE PKWY Westbound					CR 7 Northbound					ERIE PKWY 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 07:15 AM to 08:00 AM - Peak 1 of 1																					
Intersection	07:15 AM																				
Volume	85	89	50	1	225	39	688	61	0	788	104	69	21	0	194	25	579	41	0	645	1852
Percent	37.8	39.6	22.2	0.4		4.9	87.3	7.7	0.0		53.6	35.6	10.8	0.0		3.9	89.8	6.4	0.0		
07:15 Volume	19	24	9	0	52	8	176	17	0	201	30	21	6	0	57	5	157	3	0	165	475
Peak Factor																					0.975
High Int.	07:45 AM					07:30 AM					07:15 AM					07:15 AM					
Volume	26	24	14	1	65	9	178	15	0	202	30	21	6	0	57	5	157	3	0	165	
Peak Factor					0.865					0.975					0.851					0.977	

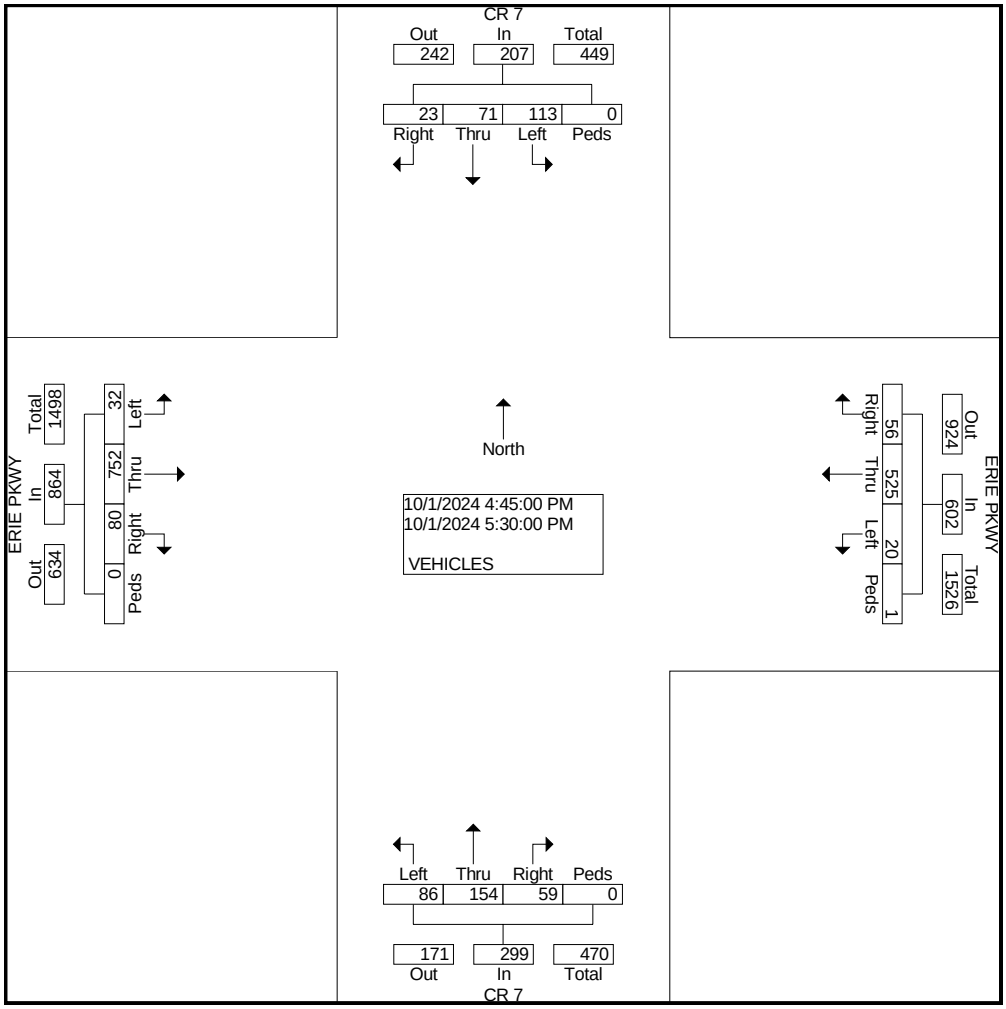


COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: CR 7
E/W STREET: ERIE PKWY
CITY: ERIE
COUNTY: BOULDER

File Name : CR7ERIEPKWY
Site Code : 00000015
Start Date : 10/1/2024

	CR 7 Southbound					ERIE PKWY Westbound					CR 7 Northbound					ERIE PKWY 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 04:45 PM to 05:30 PM - Peak 1 of 1																					
Intersection	04:45 PM																				
Volume	113	71	23	0	207	20	525	56	1	602	86	154	59	0	299	32	752	80	0	864	1972
Percent	54.6	34.3	11.1	0.0		3.3	87.2	9.3	0.2		28.8	51.5	19.7	0.0		3.7	87.0	9.3	0.0		
05:15 Volume	31	15	7	0	53	4	136	14	0	154	19	40	14	0	73	6	228	18	0	252	532
Peak Factor																					0.927
High Int.	04:45 PM					05:00 PM					05:30 PM					05:15 PM					
Volume	34	19	4	0	57	7	141	13	1	162	22	50	19	0	91	6	228	18	0	252	
Peak Factor					0.908					0.929					0.821					0.857	



COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: CR 7
E/W STREET: CR 8.75
CITY: ERIE
COUNTY: BOULDER

File Name : CR7CR8.75KIRSTIN
Site Code : 00000025
Start Date : 10/3/2024
Page No : 1

Groups Printed- VEHICLES

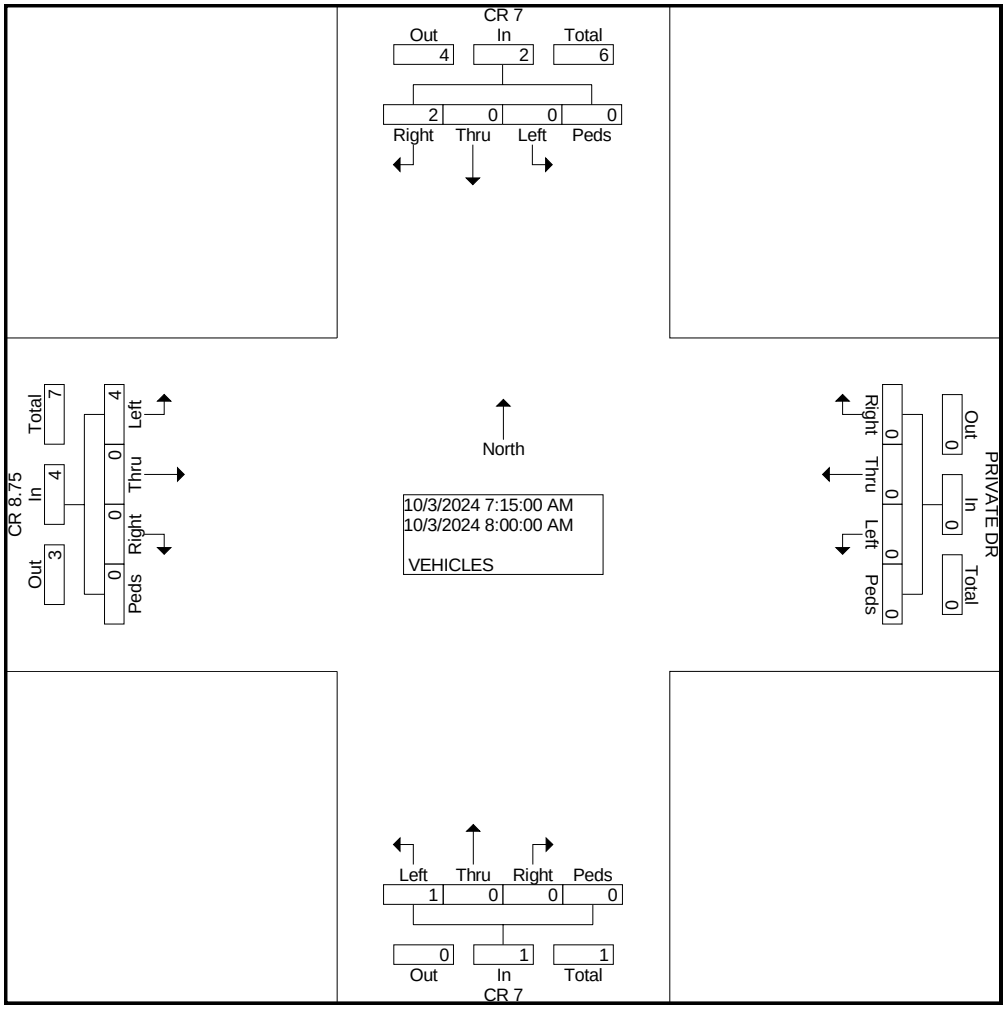
	CR 7 Southbound				PRIVATE DR Westbound				CR 7 Northbound				CR 8.75 Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	2
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	3
07:00 AM	0	0	1	0	0	0	0	0	0	0	0	0	2	0	2	0	5
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2
07:45 AM	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	4
Total	0	0	3	0	0	0	0	0	1	0	0	0	6	0	2	0	12
08:15 AM	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	2
Total	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	2
04:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	2
04:45 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	2
Total	0	0	1	0	0	0	0	0	1	0	0	1	0	0	1	0	4
05:00 PM	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	2
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
05:45 PM	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	3
Total	0	0	1	0	0	0	0	0	2	0	0	0	1	0	2	0	6
Grand Total	0	0	5	0	1	0	0	0	5	0	1	1	7	0	7	0	27
Apprch %	0.0	0.0	100.0	0.0	100.0	0.0	0.0	0.0	71.4	0.0	14.3	14.3	50.0	0.0	50.0	0.0	
Total %	0.0	0.0	18.5	0.0	3.7	0.0	0.0	0.0	18.5	0.0	3.7	3.7	25.9	0.0	25.9	0.0	

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

N/S STREET: CR 7
E/W STREET: CR 8.75
CITY: ERIE
COUNTY: BOULDER

File Name : CR7CR8.75KIRSTIN
Site Code : 00000025
Start Date : 10/3/2024

	CR 7 Southbound					PRIVATE DR Westbound					CR 7 Northbound					CR 8.75 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 07:15 AM to 08:00 AM - Peak 1 of 1																					
Intersection	07:15 AM																				
Volume	0	0	2	0	2	0	0	0	0	0	1	0	0	0	1	4	0	0	0	4	7
Percent	0.0	0.0	100.0	0.0		0.0	0.0	0.0	0.0		100.0	0.0	0.0	0.0		100.0	0.0	0.0	0.0		
07:45 Volume	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	4
Peak Factor																					0.438
High Int.	07:45 AM										07:30 AM					07:45 AM					
Volume	0	0	2	0	2	0	0	0	0	0	1	0	0	0	1	2	0	0	0	2	
Peak Factor					0.25										0.25					0.50	
					0										0					0	

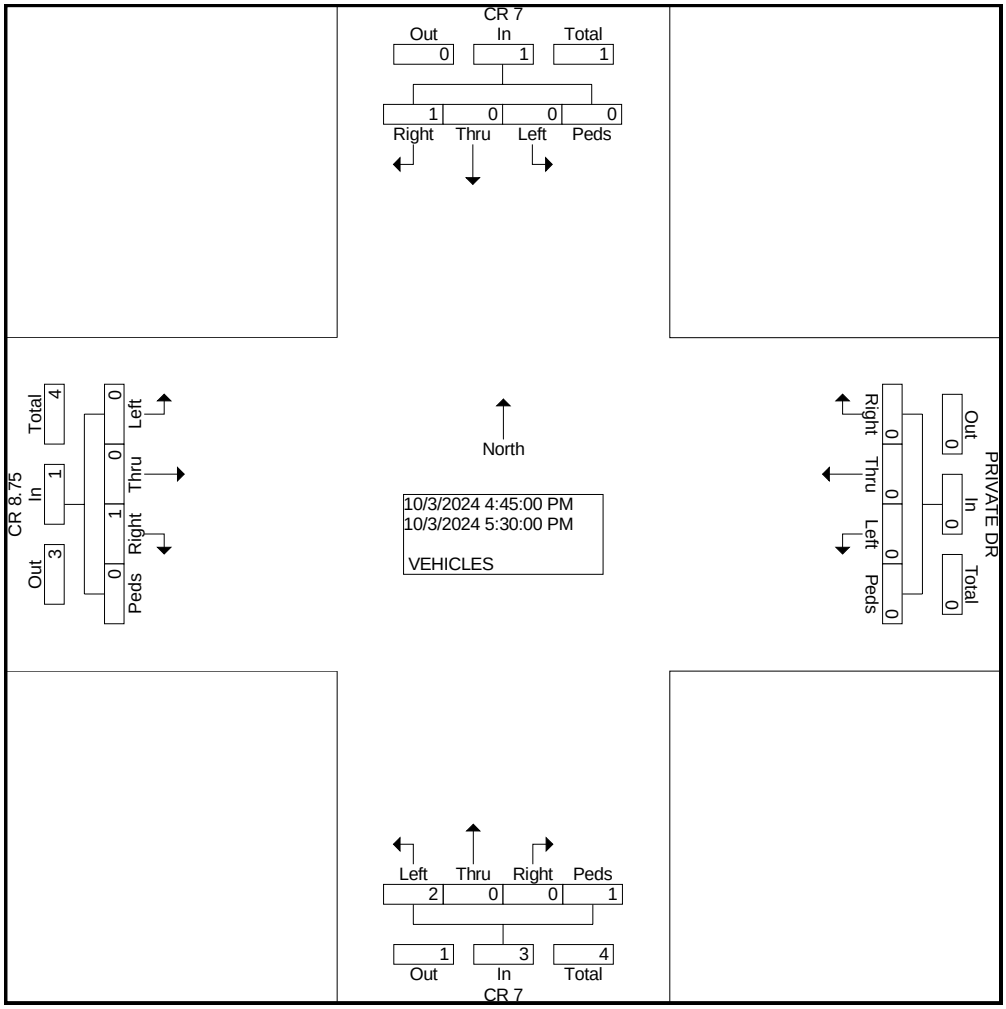


COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: CR 7
E/W STREET: CR 8.75
CITY: ERIE
COUNTY: BOULDER

File Name : CR7CR8.75KIRSTIN
Site Code : 00000025
Start Date : 10/3/2024
Page No : 3

	CR 7 Southbound					PRIVATE DR Westbound					CR 7 Northbound					CR 8.75 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 04:45 PM to 05:30 PM - Peak 1 of 1																					
Intersection	04:45 PM																				
Volume	0	0	1	0	1	0	0	0	0	0	2	0	0	1	3	0	0	1	0	1	5
Percent	0.0	0.0	100.0	0.0		0.0	0.0	0.0	0.0		66.7	0.0	0.0	33.3		0.0	0.0	100.0	0.0		
05:00 Volume	0	0	1	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2
Peak Factor																					0.625
High Int.	05:00 PM										04:45 PM					05:15 PM					
Volume	0	0	1	0	1	0	0	0	0	0	1	0	0	1	2	0	0	1	0	1	
Peak Factor					0.250										0.375					0.250	



NORTH WESTERLY
Location: CR 10 E-O CR 5
City: ERIE
County: BOULDER
Direction: EAST/WEST

COUNTER MEASURES, INC.
TRAFFIC AND TRANSPORTATION FIELD DATA

Site Code:2415306
Site Code:2415306
Start Date: 10152024 10/15/2024
End Date: 10162024 10/16/2024
Longitude: 0.000000
Longitude: 0.000000

10/15/2024 Time	EAST	WEST	Total
12:00 AM	*	*	0
1:00	*	*	0
2:00	*	*	0
3:00	*	*	0
4:00	*	*	0
5:00	*	*	0
6:00	*	*	0
7:00	*	*	0
8:00	*	*	0
9:00	*	*	0
10:00	81	102	183
11:00	78	38	116
12:00 PM	73	29	102
1:00	82	38	120
2:00	81	36	117
3:00	78	43	121
4:00	95	53	148
5:00	154	73	227
6:00	151	89	240
7:00	54	35	89
8:00	43	23	66
9:00	32	17	49
10:00	22	11	33
11:00	18	10	28
Total	1042	597	1639
Percent	63.6%	36.4%	
AM Peak	10:00	10:00	10:00
Volume	81	102	183
PM Peak	5:00	6:00	6:00
Volume	154	89	240

NORTH WESTERLY
Location: CR 10 E-O CR 5
City: ERIE
County: BOULDER
Direction: EAST/WEST

COUNTER MEASURES, INC.
TRAFFIC AND TRANSPORTATION FIELD DATA

Site Code:2415306
Site Code:2415306
Start Date: 10152024 10/15/2024
End Date: 10162024 10/16/2024
Longitude: 0.000000
Longitude: 0.000000

10/16/2024 Time	EAST	WEST		Total
12:00 AM	16	9		25
1:00	11	7		18
2:00	9	8		17
3:00	9	7		16
4:00	11	9		20
5:00	31	18		49
6:00	54	27		81
7:00	87	64		151
8:00	181	103		284
9:00	127	85		212
10:00	76	109		185
11:00	*	*		0
12:00 PM	*	*		0
1:00	*	*		0
2:00	*	*		0
3:00	*	*		0
4:00	*	*		0
5:00	*	*		0
6:00	*	*		0
7:00	*	*		0
8:00	*	*		0
9:00	*	*		0
10:00	*	*		0
11:00	*	*		0
Total	612	446		1058
Percent	57.8%	42.2%		
AM Peak	8:00	10:00		8:00
Volume	181	109		284
PM Peak				
Volume				
Grand Total	1654	1043		2697
Percent	61.3%	38.7%		
ADT		ADT: 2,513	AADT: 2,513	

NORTH WESTERLY
Location: CR 5 S-O CR 10
City: ERIE
County: BOULDER
Direction: NORTH/SOUTH

COUNTER MEASURES, INC.
TRAFFIC AND TRANSPORTATION FIELD DATA

Site Code:2415303
Site Code:2415303
Start Date: 10152024 10/15/2024
End Date: 10162024 10/16/2024
Longitude: 0.000000
Longitude: 0.000000

10/15/2024 Time	NORTH	SOUTH	Total
12:00 AM	*	*	0
1:00	*	*	0
2:00	*	*	0
3:00	*	*	0
4:00	*	*	0
5:00	*	*	0
6:00	*	*	0
7:00	*	*	0
8:00	*	*	0
9:00	*	*	0
10:00	82	77	159
11:00	74	94	168
12:00 PM	81	90	171
1:00	92	79	171
2:00	94	81	175
3:00	104	97	201
4:00	136	109	245
5:00	156	158	314
6:00	191	184	375
7:00	119	77	196
8:00	84	46	130
9:00	52	31	83
10:00	31	19	50
11:00	24	18	42
Total	1320	1160	2480
Percent	53.2%	46.8%	
AM Peak	10:00	11:00	11:00
Volume	82	94	168
PM Peak	6:00	6:00	6:00
Volume	191	184	375

NORTH WESTERLY
Location: CR 5 S-O CR 10
City: ERIE
County: BOULDER
Direction: NORTH/SOUTH

COUNTER MEASURES, INC.
TRAFFIC AND TRANSPORTATION FIELD DATA

Site Code:2415303
Site Code:2415303
Start Date: 10152024 10/15/2024
End Date: 10162024 10/16/2024
Longitude: 0.000000
Longitude: 0.000000

10/16/2024 Time	NORTH	SOUTH	Total
12:00 AM	21	14	35
1:00	9	12	21
2:00	8	14	22
3:00	11	20	31
4:00	19	26	45
5:00	31	46	77
6:00	51	76	127
7:00	91	121	212
8:00	153	324	477
9:00	141	241	382
10:00	82	129	211
11:00	*	*	0
12:00 PM	*	*	0
1:00	*	*	0
2:00	*	*	0
3:00	*	*	0
4:00	*	*	0
5:00	*	*	0
6:00	*	*	0
7:00	*	*	0
8:00	*	*	0
9:00	*	*	0
10:00	*	*	0
11:00	*	*	0
Total	617	1023	1640
Percent	37.6%	62.4%	
AM Peak	8:00	8:00	8:00
Volume	153	324	477
PM Peak			
Volume			
Grand Total	1937	2183	4120
Percent	47.0%	53.0%	
ADT		ADT: 3,935	AADT: 3,935

NORTH WESTERLY
Location: CR 7 S-O CR 8.75
City: ERIE
County: BOULDER
Direction: NORTH/SOUTH

COUNTER MEASURES, INC.
TRAFFIC AND TRANSPORTATION FIELD DATA

Site Code:2415304
Site Code:2415304
Start Date: 10152024 10/15/2024
End Date: 10162024 10/16/2024
Longitude: 0.000000
Longitude: 0.000000

10/15/2024 Time	NORTH	SOUTH	Total
12:00 AM	*	*	0
1:00	*	*	0
2:00	*	*	0
3:00	*	*	0
4:00	*	*	0
5:00	*	*	0
6:00	*	*	0
7:00	*	*	0
8:00	*	*	0
9:00	28	66	94
10:00	81	151	232
11:00	79	162	241
12:00 PM	82	168	250
1:00	94	174	268
2:00	109	191	300
3:00	161	226	387
4:00	174	291	465
5:00	210	436	646
6:00	224	463	687
7:00	110	289	399
8:00	57	167	224
9:00	24	94	118
10:00	19	34	53
11:00	12	26	38
Total	1464	2938	4402
Percent	33.3%	66.7%	
AM Peak	10:00	11:00	11:00
Volume	81	162	241
PM Peak	6:00	6:00	6:00
Volume	224	463	687

NORTH WESTERLY
Location: CR 7 S-O CR 8.75
City: ERIE
County: BOULDER
Direction: NORTH/SOUTH

COUNTER MEASURES, INC.
TRAFFIC AND TRANSPORTATION FIELD DATA

Site Code:2415304
Site Code:2415304
Start Date: 10152024 10/15/2024
End Date: 10162024 10/16/2024
Longitude: 0.000000
Longitude: 0.000000

10/16/2024 Time	NORTH	SOUTH		Total
12:00 AM	9	14		23
1:00	4	11		15
2:00	1	4		5
3:00	1	9		10
4:00	2	12		14
5:00	16	26		42
6:00	41	57		98
7:00	91	109		200
8:00	176	214		390
9:00	132	221		353
10:00	*	*		0
11:00	*	*		0
12:00 PM	*	*		0
1:00	*	*		0
2:00	*	*		0
3:00	*	*		0
4:00	*	*		0
5:00	*	*		0
6:00	*	*		0
7:00	*	*		0
8:00	*	*		0
9:00	*	*		0
10:00	*	*		0
11:00	*	*		0
Total	473	677		1150
Percent	41.1%	58.9%		
AM Peak	8:00	9:00		8:00
Volume	176	221		390
PM Peak				
Volume				
Grand Total	1937	3615		5552
Percent	34.9%	65.1%		
ADT		ADT: 5,328	AADT: 5,328	

NORTH WESTERLY
Location: ERIE PKWY W-O CR 7
City: ERIE
County: BOULDER
Direction: EAST/WEST

COUNTER MEASURES, INC.
TRAFFIC AND TRANSPORTATION FIELD DATA

Site Code:2430305
Site Code:2430305
Start Date: 10152024 10/15/2024
End Date: 10162024 10/16/2024
Longitude: 0.000000
Longitude: 0.000000

10/15/2024 Time	EAST	WEST	Total
12:00 AM	*	*	0
1:00	*	*	0
2:00	*	*	0
3:00	*	*	0
4:00	*	*	0
5:00	*	*	0
6:00	*	*	0
7:00	*	*	0
8:00	*	*	0
9:00	211	344	555
10:00	237	461	698
11:00	208	381	589
12:00 PM	198	290	488
1:00	204	247	451
2:00	213	239	452
3:00	341	289	630
4:00	526	368	894
5:00	819	556	1375
6:00	868	756	1624
7:00	412	346	758
8:00	161	150	311
9:00	84	71	155
10:00	74	48	122
11:00	60	36	96
Total	4616	4582	9198
Percent	50.2%	49.8%	
AM Peak	10:00	10:00	10:00
Volume	237	461	698
PM Peak	6:00	6:00	6:00
Volume	868	756	1624

NORTH WESTERLY
Location: ERIE PKWY W-O CR 7
City: ERIE
County: BOULDER
Direction: EAST/WEST

COUNTER MEASURES, INC.
TRAFFIC AND TRANSPORTATION FIELD DATA

Site Code:2430305
Site Code:2430305
Start Date: 10152024 10/15/2024
End Date: 10162024 10/16/2024
Longitude: 0.000000
Longitude: 0.000000

10/16/2024 Time	EAST	WEST		Total
12:00 AM	32	30		62
1:00	24	27		51
2:00	26	34		60
3:00	34	47		81
4:00	72	89		161
5:00	184	227		411
6:00	289	317		606
7:00	461	436		897
8:00	642	831		1473
9:00	448	652		1100
10:00	246	449		695
11:00	*	*		0
12:00 PM	*	*		0
1:00	*	*		0
2:00	*	*		0
3:00	*	*		0
4:00	*	*		0
5:00	*	*		0
6:00	*	*		0
7:00	*	*		0
8:00	*	*		0
9:00	*	*		0
10:00	*	*		0
11:00	*	*		0
Total	2458	3139		5597
Percent	43.9%	56.1%		
AM Peak	8:00	8:00		8:00
Volume	642	831		1473
PM Peak				
Volume				
Grand Total	7074	7721		14795
Percent	47.8%	52.2%		
ADT		ADT: 13,271	AADT: 13,271	

Level of Service Definitions

LEVEL OF SERVICE DEFINITIONS

From *Highway Capacity Manual*, Transportation Research Board

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

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.

Level of Service Reports

Intersection	
Int Delay, s/veh	10

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	65	128	32	104	1	81	85	21	5	172	9
Future Vol, veh/h	11	65	128	32	104	1	81	85	21	5	172	9
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	190	-	-	-	-	-	255	-	-	-	-	145
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	81	160	40	130	1	101	106	26	6	215	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	614	561	215	674	559	119	226	0	0	132	0	0
Stage 1	227	227	-	321	321	-	-	-	-	-	-	-
Stage 2	387	334	-	353	238	-	-	-	-	-	-	-
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	404	436	825	368	438	933	1342	-	-	1453	-	-
Stage 1	776	716	-	691	652	-	-	-	-	-	-	-
Stage 2	637	643	-	664	708	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	285	401	825	236	403	933	1342	-	-	1453	-	-
Mov Cap-2 Maneuver	285	401	-	236	403	-	-	-	-	-	-	-
Stage 1	718	712	-	639	603	-	-	-	-	-	-	-
Stage 2	461	595	-	472	704	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15	25.1	3.4	0.2
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1342	-	-	285	608	347	1453	-	-
HCM Lane V/C Ratio	0.075	-	-	0.048	0.397	0.494	0.004	-	-
HCM Control Delay (s)	7.9	-	-	18.3	14.8	25.1	7.5	0	-
HCM Lane LOS	A	-	-	C	B	D	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.2	1.9	2.6	0	-	-

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	7	12	68	7	47	4	64	91	2	3	146	14
Future Vol, veh/h	7	12	68	7	47	4	64	91	2	3	146	14
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	12	70	7	48	4	66	94	2	3	151	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	417	392	158	432	398	95	165	0	0	96	0	0
Stage 1	164	164	-	227	227	-	-	-	-	-	-	-
Stage 2	253	228	-	205	171	-	-	-	-	-	-	-
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	546	544	887	534	540	962	1413	-	-	1498	-	-
Stage 1	838	762	-	776	716	-	-	-	-	-	-	-
Stage 2	751	715	-	797	757	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	485	516	887	464	512	962	1413	-	-	1498	-	-
Mov Cap-2 Maneuver	485	516	-	464	512	-	-	-	-	-	-	-
Stage 1	797	760	-	738	681	-	-	-	-	-	-	-
Stage 2	661	680	-	721	755	-	-	-	-	-	-	-

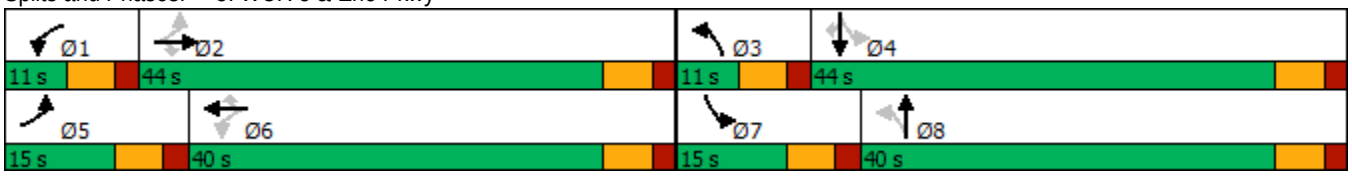
Approach	EB	WB	NB	SB
HCM Control Delay, s	10.4	12.8	3.1	0.1
HCM LOS	B	B		

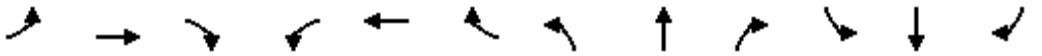
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1413	-	-	761	522	1498	-	-
HCM Lane V/C Ratio	0.047	-	-	0.118	0.115	0.002	-	-
HCM Control Delay (s)	7.7	0	-	10.4	12.8	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.4	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	227	443	140	70	532	208	63	219	195	207	199
Future Volume (vph)	227	443	140	70	532	208	63	219	195	207	199
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8	7	4	
Permitted Phases	2		2	6		6	8		4		4
Detector Phase	5	2	2	1	6	6	3	8	7	4	4
Switch Phase											
Minimum Initial (s)	5.0	25.0	25.0	5.0	25.0	25.0	5.0	8.0	5.0	8.0	8.0
Minimum Split (s)	11.0	36.0	36.0	11.0	36.0	36.0	11.0	40.0	11.0	40.0	40.0
Total Split (s)	15.0	44.0	44.0	11.0	40.0	40.0	11.0	40.0	15.0	44.0	44.0
Total Split (%)	13.6%	40.0%	40.0%	10.0%	36.4%	36.4%	10.0%	36.4%	13.6%	40.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	47.5	40.5	40.5	39.1	34.1	34.1	23.5	18.5	32.0	24.9	24.9
Actuated g/C Ratio	0.50	0.43	0.43	0.41	0.36	0.36	0.25	0.20	0.34	0.26	0.26
v/c Ratio	1.06	0.64	0.21	0.26	0.91	0.33	0.23	0.78	0.78	0.26	0.39
Control Delay	99.6	28.1	4.2	15.7	50.0	4.6	22.4	50.5	43.0	28.9	5.9
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	99.6	28.1	4.2	15.7	50.0	4.6	22.4	50.5	43.0	28.9	5.9
LOS	F	C	A	B	D	A	C	D	D	C	A
Approach Delay		44.0			35.4			44.8		25.8	
Approach LOS		D			D			D		C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 94.7	
Natural Cycle: 110	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.06	
Intersection Signal Delay: 37.0	Intersection LOS: D
Intersection Capacity Utilization 84.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: WCR 5 & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	227	443	140	70	532	208	63	219	27	195	207	199
Future Volume (veh/h)	227	443	140	70	532	208	63	219	27	195	207	199
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	261	509	161	80	611	239	72	252	31	224	238	229
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	289	779	660	313	685	581	323	296	36	285	826	368
Arrive On Green	0.10	0.42	0.42	0.05	0.37	0.37	0.05	0.18	0.18	0.10	0.23	0.23
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	1633	201	1781	3554	1585
Grp Volume(v), veh/h	261	509	161	80	611	239	72	0	283	224	238	229
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	0	1834	1781	1777	1585
Q Serve(g_s), s	8.4	20.3	6.1	2.6	28.5	10.4	3.0	0.0	13.9	9.0	5.1	12.0
Cycle Q Clear(g_c), s	8.4	20.3	6.1	2.6	28.5	10.4	3.0	0.0	13.9	9.0	5.1	12.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	289	779	660	313	685	581	323	0	332	285	826	368
V/C Ratio(X)	0.90	0.65	0.24	0.26	0.89	0.41	0.22	0.00	0.85	0.79	0.29	0.62
Avail Cap(c_a), veh/h	289	779	660	326	685	581	338	0	672	285	1455	649
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.3	21.7	17.6	18.2	27.7	21.9	28.9	0.0	36.8	29.2	29.3	32.0
Incr Delay (d2), s/veh	29.0	4.2	0.9	0.2	16.2	2.2	0.1	0.0	2.4	12.5	0.1	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	8.8	2.3	1.0	14.5	4.1	1.3	0.0	6.2	4.9	2.1	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.3	26.0	18.5	18.3	43.9	24.1	29.0	0.0	39.2	41.6	29.4	32.6
LnGrp LOS	D	C	B	B	D	C	C	A	D	D	C	C
Approach Vol, veh/h		931			930			355			691	
Approach Delay, s/veh		31.5			36.6			37.2			34.4	
Approach LOS		C			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.4	44.6	10.2	27.6	15.0	40.0	15.0	22.8
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	38.0	5.0	38.0	9.0	34.0	9.0	34.0
Max Q Clear Time (g_c+I1), s	4.6	22.3	5.0	14.0	10.4	30.5	11.0	15.9
Green Ext Time (p_c), s	0.0	4.4	0.0	1.3	0.0	1.9	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	34.5
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	673	3	31	737	3	12
Future Vol, veh/h	673	3	31	737	3	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	110	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	801	4	37	877	4	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	805	0	1754	803
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	951	-
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	-	-	819	-	94	383
Stage 1	-	-	-	-	441	-
Stage 2	-	-	-	-	375	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	819	-	90	383
Mov Cap-2 Maneuver	-	-	-	-	90	-
Stage 1	-	-	-	-	441	-
Stage 2	-	-	-	-	358	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	14.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	383	-	-	819	-
HCM Lane V/C Ratio	0.037	-	-	0.045	-
HCM Control Delay (s)	14.8	-	-	9.6	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	684	1	20	755	0	8
Future Vol, veh/h	684	1	20	755	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	786	1	23	868	0	9

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	787	0	-	787
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.12	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.218	-	-	3.318
Pot Cap-1 Maneuver	-	-	832	-	0	392
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	832	-	-	392
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

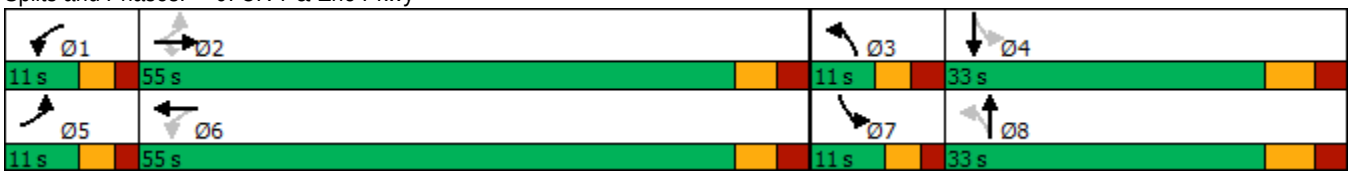
Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	14.4
HCM LOS			B

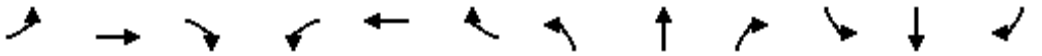
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	392	-	-	832	-
HCM Lane V/C Ratio	0.023	-	-	0.028	-
HCM Control Delay (s)	14.4	-	-	9.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	25	579	41	39	688	104	69	85	89
Future Volume (vph)	25	579	41	39	688	104	69	85	89
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6	3	8	7	4
Permitted Phases	2		2	6		8		4	
Detector Phase	5	2	2	1	6	3	8	7	4
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	10.0	32.3	32.3	10.0	32.3	10.8	32.8	10.0	32.8
Total Split (s)	11.0	55.0	55.0	11.0	55.0	11.0	33.0	11.0	33.0
Total Split (%)	10.0%	50.0%	50.0%	10.0%	50.0%	10.0%	30.0%	10.0%	30.0%
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	2.8	2.0	2.8
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	6.3	6.3	5.0	6.3	5.8	6.8	5.0	6.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	None	None	None	None
Act Effct Green (s)	54.1	49.5	49.5	55.0	51.6	17.4	12.4	18.9	12.4
Actuated g/C Ratio	0.60	0.55	0.55	0.61	0.58	0.19	0.14	0.21	0.14
v/c Ratio	0.08	0.58	0.04	0.09	0.72	0.40	0.35	0.29	0.54
Control Delay	8.0	18.5	0.1	7.9	21.7	33.4	36.4	29.6	39.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.0	18.5	0.1	7.9	21.7	33.4	36.4	29.6	39.4
LOS	A	B	A	A	C	C	D	C	D
Approach Delay		17.0			21.1		34.8		35.7
Approach LOS		B			C		C		D

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 89.7	
Natural Cycle: 100	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 22.8	Intersection LOS: C
Intersection Capacity Utilization 69.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 9: CR 7 & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	579	41	39	688	61	104	69	21	85	89	50
Future Volume (veh/h)	25	579	41	39	688	61	104	69	21	85	89	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	26	591	42	40	702	62	106	70	21	87	91	51
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	282	1001	848	396	921	81	220	163	49	275	124	69
Arrive On Green	0.03	0.54	0.54	0.03	0.54	0.54	0.06	0.12	0.12	0.06	0.11	0.11
Sat Flow, veh/h	1781	1870	1585	1781	1694	150	1781	1381	414	1781	1126	631
Grp Volume(v), veh/h	26	591	42	40	0	764	106	0	91	87	0	142
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1843	1781	0	1796	1781	0	1757
Q Serve(g_s), s	0.6	19.5	1.2	0.9	0.0	29.4	4.8	0.0	4.3	3.9	0.0	7.1
Cycle Q Clear(g_c), s	0.6	19.5	1.2	0.9	0.0	29.4	4.8	0.0	4.3	3.9	0.0	7.1
Prop In Lane	1.00		1.00	1.00		0.08	1.00		0.23	1.00		0.36
Lane Grp Cap(c), veh/h	282	1001	848	396	0	1002	220	0	212	275	0	193
V/C Ratio(X)	0.09	0.59	0.05	0.10	0.00	0.76	0.48	0.00	0.43	0.32	0.00	0.74
Avail Cap(c_a), veh/h	352	1001	848	451	0	1002	220	0	517	290	0	506
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.5	14.4	10.1	10.8	0.0	16.2	33.9	0.0	37.3	33.2	0.0	39.2
Incr Delay (d2), s/veh	0.1	2.6	0.1	0.1	0.0	5.5	1.6	0.0	1.4	0.7	0.0	5.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	7.6	0.4	0.3	0.0	11.6	2.1	0.0	1.9	1.6	0.0	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.7	16.9	10.2	10.9	0.0	21.6	35.5	0.0	38.6	33.9	0.0	44.6
LnGrp LOS	B	B	B	B	A	C	D	A	D	C	A	D
Approach Vol, veh/h		659			804			197			229	
Approach Delay, s/veh		16.4			21.1			36.9			40.5	
Approach LOS		B			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	55.0	11.0	16.8	7.4	55.8	10.2	17.6
Change Period (Y+Rc), s	5.0	* 6.3	* 5.8	* 6.8	5.0	* 6.3	5.0	* 6.8
Max Green Setting (Gmax), s	6.0	* 49	* 5.2	* 26	6.0	* 49	6.0	* 26
Max Q Clear Time (g_c+I1), s	2.9	21.5	6.8	9.1	2.6	31.4	5.9	6.3
Green Ext Time (p_c), s	0.0	3.7	0.0	0.6	0.0	4.5	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	23.5
HCM 6th LOS	C

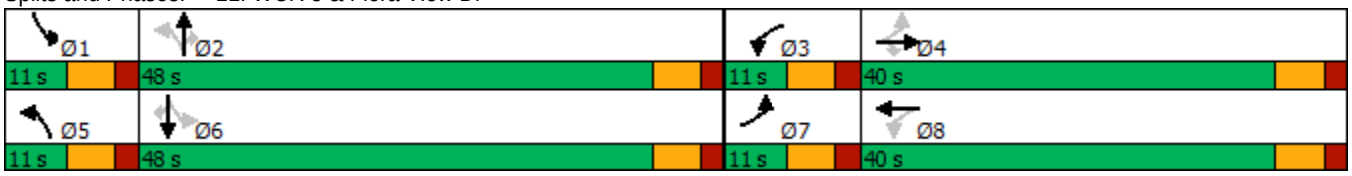
Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	4	82	96	81	31	92	151	123	82	281	9
Future Volume (vph)	4	82	96	81	31	92	151	123	82	281	9
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	10.0	10.0	5.0	10.0	5.0	25.0	25.0	5.0	25.0	25.0
Minimum Split (s)	11.0	40.0	40.0	11.0	40.0	11.0	36.0	36.0	11.0	36.0	36.0
Total Split (s)	11.0	40.0	40.0	11.0	40.0	11.0	48.0	48.0	11.0	48.0	48.0
Total Split (%)	10.0%	36.4%	36.4%	10.0%	36.4%	10.0%	43.6%	43.6%	10.0%	43.6%	43.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	17.4	12.4	12.4	22.2	21.3	47.0	42.0	42.0	47.0	42.0	42.0
Actuated g/C Ratio	0.20	0.14	0.14	0.25	0.24	0.53	0.48	0.48	0.53	0.48	0.48
v/c Ratio	0.03	0.53	0.45	0.46	0.26	0.37	0.28	0.24	0.23	0.53	0.02
Control Delay	23.8	42.9	10.0	32.5	17.2	11.6	15.7	3.0	9.6	19.5	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	23.8	42.9	10.0	32.5	17.2	11.6	15.7	3.0	9.6	19.5	0.0
LOS	C	D	A	C	B	B	B	A	A	B	A
Approach Delay		25.1			25.4		10.4			16.8	
Approach LOS		C			C		B			B	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 88.4	
Natural Cycle: 100	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 17.2	Intersection LOS: B
Intersection Capacity Utilization 52.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 11: WCR 5 & Flora View Dr



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	82	96	81	31	39	92	151	123	82	281	9
Future Volume (veh/h)	4	82	96	81	31	39	92	151	123	82	281	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	7	137	160	135	52	65	153	252	205	137	468	15
Peak Hour Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	253	251	213	255	138	172	461	895	758	555	895	758
Arrive On Green	0.01	0.13	0.13	0.06	0.18	0.18	0.06	0.48	0.48	0.06	0.48	0.48
Sat Flow, veh/h	1781	1870	1585	1781	756	945	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	7	137	160	135	0	117	153	252	205	137	468	15
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1700	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.3	6.0	8.5	5.0	0.0	5.3	3.8	7.1	6.8	3.4	15.3	0.4
Cycle Q Clear(g_c), s	0.3	6.0	8.5	5.0	0.0	5.3	3.8	7.1	6.8	3.4	15.3	0.4
Prop In Lane	1.00		1.00	1.00		0.56	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	253	251	213	255	0	310	461	895	758	555	895	758
V/C Ratio(X)	0.03	0.55	0.75	0.53	0.00	0.38	0.33	0.28	0.27	0.25	0.52	0.02
Avail Cap(c_a), veh/h	339	724	614	255	0	658	461	895	758	555	895	758
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.4	35.5	36.6	32.0	0.0	31.5	12.0	13.8	13.7	10.6	15.9	12.1
Incr Delay (d2), s/veh	0.0	1.8	5.3	2.1	0.0	0.8	0.4	0.8	0.9	0.2	2.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	2.8	3.6	2.6	0.0	2.2	1.4	3.0	0.2	1.2	6.5	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.4	37.3	41.8	34.0	0.0	32.3	12.4	14.6	14.6	10.8	18.1	12.1
LnGrp LOS	C	D	D	C	A	C	B	B	B	B	B	B
Approach Vol, veh/h		304			252			610			620	
Approach Delay, s/veh		39.6			33.2			14.0			16.4	
Approach LOS		D			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	48.0	11.0	17.8	11.0	48.0	6.8	22.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	42.0	5.0	34.0	5.0	42.0	5.0	34.0
Max Q Clear Time (g_c+I1), s	5.4	9.1	7.0	10.5	5.8	17.3	2.3	7.3
Green Ext Time (p_c), s	0.0	2.2	0.0	1.3	0.0	3.0	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	21.9
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	1	186	223	2
Future Vol, veh/h	0	0	1	186	223	2
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	1	214	256	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	473	257	258	0	-	0
Stage 1	257	-	-	-	-	-
Stage 2	216	-	-	-	-	-
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	550	782	1307	-	-	-
Stage 1	786	-	-	-	-	-
Stage 2	820	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	549	782	1307	-	-	-
Mov Cap-2 Maneuver	549	-	-	-	-	-
Stage 1	785	-	-	-	-	-
Stage 2	820	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1307	-	-	-	-
HCM Lane V/C Ratio	0.001	-	-	-	-
HCM Control Delay (s)	7.8	0	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	5	463	45	42	414
Future Vol, veh/h	3	5	463	45	42	414
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	-	-	0	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	6	565	55	51	505

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	920	283	0	0	620	0
Stage 1	565	-	-	-	-	-
Stage 2	355	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	270	714	-	-	956	-
Stage 1	532	-	-	-	-	-
Stage 2	681	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	256	714	-	-	956	-
Mov Cap-2 Maneuver	256	-	-	-	-	-
Stage 1	532	-	-	-	-	-
Stage 2	645	-	-	-	-	-

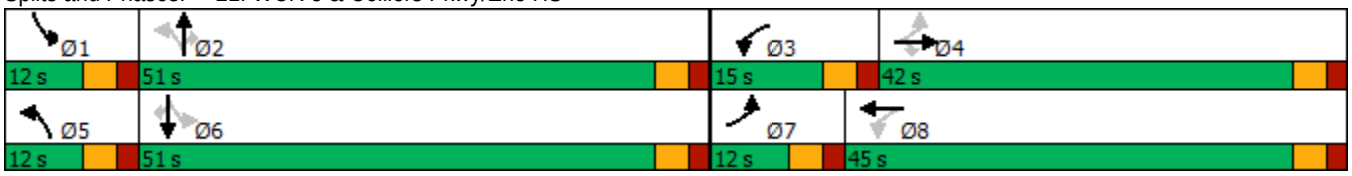
Approach	WB	NB	SB
HCM Control Delay, s	13.6	0	0.8
HCM LOS	B		

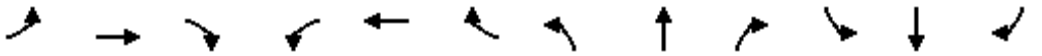
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	427	956	-
HCM Lane V/C Ratio	-	-	0.023	0.054	-
HCM Control Delay (s)	-	-	13.6	9	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	178	126	207	214	65	46	243	107	118	273	26
Future Volume (vph)	178	126	207	214	65	46	243	107	118	273	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	15.0	15.0	5.0	10.0	5.0	15.0	15.0	5.0	10.0	10.0
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0
Total Split (s)	12.0	42.0	42.0	15.0	45.0	12.0	51.0	51.0	12.0	51.0	51.0
Total Split (%)	10.0%	35.0%	35.0%	12.5%	37.5%	10.0%	42.5%	42.5%	10.0%	42.5%	42.5%
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)	24.2	17.2	17.2	30.2	20.2	52.6	46.0	46.0	54.2	48.6	48.6
Actuated g/C Ratio	0.24	0.17	0.17	0.30	0.20	0.52	0.46	0.46	0.54	0.49	0.49
v/c Ratio	0.94	0.57	0.59	0.95	0.59	0.12	0.22	0.20	0.31	0.23	0.05
Control Delay	73.6	45.7	9.3	70.2	32.9	10.6	17.1	3.5	12.3	16.5	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	73.6	45.7	9.3	70.2	32.9	10.6	17.1	3.5	12.3	16.5	0.1
LOS	E	D	A	E	C	B	B	A	B	B	A
Approach Delay		40.7			54.7		12.7			14.3	
Approach LOS		D			D		B			B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 100.2	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 30.6	Intersection LOS: C
Intersection Capacity Utilization 60.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 21: WCR 5 & Colliers Pkwy/Erie HS





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	178	126	207	214	65	87	46	243	107	118	273	26
Future Volume (veh/h)	178	126	207	214	65	87	46	243	107	118	273	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.94		0.89	0.95		0.91	0.95		0.98	0.99		0.91
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	258	183	300	310	94	126	67	352	155	171	396	38
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	346	451	339	367	184	246	477	1494	653	495	1581	642
Arrive On Green	0.06	0.24	0.24	0.09	0.27	0.27	0.04	0.42	0.42	0.06	0.44	0.44
Sat Flow, veh/h	1781	1870	1406	1781	684	917	1781	3554	1553	1781	3554	1444
Grp Volume(v), veh/h	258	183	300	310	0	220	67	352	155	171	396	38
Grp Sat Flow(s),veh/h/ln	1781	1870	1406	1781	0	1601	1781	1777	1553	1781	1777	1444
Q Serve(g_s), s	7.0	9.0	22.5	10.0	0.0	12.7	2.3	7.0	7.0	6.0	7.6	1.6
Cycle Q Clear(g_c), s	7.0	9.0	22.5	10.0	0.0	12.7	2.3	7.0	7.0	6.0	7.6	1.6
Prop In Lane	1.00		1.00	1.00		0.57	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	346	451	339	367	0	430	477	1494	653	495	1581	642
V/C Ratio(X)	0.75	0.41	0.88	0.85	0.00	0.51	0.14	0.24	0.24	0.35	0.25	0.06
Avail Cap(c_a), veh/h	346	633	475	367	0	585	520	1494	653	495	1581	642
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.3	34.9	40.0	34.3	0.0	33.9	16.7	20.4	20.4	16.4	19.0	17.3
Incr Delay (d2), s/veh	8.5	0.6	13.6	16.5	0.0	0.9	0.1	0.4	0.9	0.4	0.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	4.2	9.0	4.9	0.0	5.0	1.0	3.0	2.7	2.5	3.2	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.8	35.5	53.6	50.8	0.0	34.9	16.8	20.8	21.3	16.8	19.4	17.5
LnGrp LOS	D	D	D	D	A	C	B	C	C	B	B	B
Approach Vol, veh/h		741			530			574			605	
Approach Delay, s/veh		46.1			44.2			20.4			18.5	
Approach LOS		D			D			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	51.0	15.0	31.4	9.3	53.7	12.0	34.4
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	46.0	10.0	37.0	7.0	46.0	7.0	40.0
Max Q Clear Time (g_c+I1), s	8.0	9.0	12.0	24.5	4.3	9.6	9.0	14.7
Green Ext Time (p_c), s	0.0	3.1	0.0	1.9	0.0	3.0	0.0	1.4

Intersection Summary	
HCM 6th Ctrl Delay	32.8
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	49	3	0	37	0	359	319	100	591	3
Future Vol, veh/h	0	0	49	3	0	37	0	359	319	100	591	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	-	-	0	-	-	-	-	-	250	125	-	120
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	68	68	68	68	68	68	68	68	68	68	68	68
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	72	4	0	54	0	528	469	147	869	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	435	1257	1695	264	-	0	0	997	0	0
Stage 1	-	-	-	528	528	-	-	-	-	-	-	-
Stage 2	-	-	-	729	1167	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	7.54	6.54	6.94	-	-	-	4.14	-	-
Critical Hdwy Stg 1	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	3.52	4.02	3.32	-	-	-	2.22	-	-
Pot Cap-1 Maneuver	0	0	569	128	92	734	0	-	-	690	-	-
Stage 1	0	0	-	502	526	-	0	-	-	-	-	-
Stage 2	0	0	-	380	266	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	569	93	72	734	-	-	-	690	-	-
Mov Cap-2 Maneuver	-	-	-	93	72	-	-	-	-	-	-	-
Stage 1	-	-	-	502	526	-	-	-	-	-	-	-
Stage 2	-	-	-	261	209	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.2	13.5	0	1.7
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	569	484	690	-	-
HCM Lane V/C Ratio	-	-	0.127	0.122	0.213	-	-
HCM Control Delay (s)	-	-	12.2	13.5	11.6	-	-
HCM Lane LOS	-	-	B	B	B	-	-
HCM 95th %tile Q(veh)	-	-	0.4	0.4	0.8	-	-

Intersection	
Int Delay, s/veh	7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	111	47	12	64	8	80	110	21	9	133	17
Future Vol, veh/h	7	111	47	12	64	8	80	110	21	9	133	17
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	190	-	-	-	-	-	255	-	-	-	-	145
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	7	118	50	13	68	9	85	117	22	10	141	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	498	470	141	552	477	128	159	0	0	139	0	0
Stage 1	161	161	-	298	298	-	-	-	-	-	-	-
Stage 2	337	309	-	254	179	-	-	-	-	-	-	-
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	483	492	907	444	487	922	1420	-	-	1445	-	-
Stage 1	841	765	-	711	667	-	-	-	-	-	-	-
Stage 2	677	660	-	750	751	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	402	459	907	320	454	922	1420	-	-	1445	-	-
Mov Cap-2 Maneuver	402	459	-	320	454	-	-	-	-	-	-	-
Stage 1	791	759	-	668	627	-	-	-	-	-	-	-
Stage 2	562	620	-	594	745	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.7	15	2.9	0.4
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1420	-	-	402	538	449	1445	-	-
HCM Lane V/C Ratio	0.06	-	-	0.019	0.312	0.199	0.007	-	-
HCM Control Delay (s)	7.7	-	-	14.1	14.7	15	7.5	0	-
HCM Lane LOS	A	-	-	B	B	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	1.3	0.7	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	18	26	98	8	16	5	56	177	4	3	223	9
Future Vol, veh/h	18	26	98	8	16	5	56	177	4	3	223	9
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	30	111	9	18	6	64	201	5	3	253	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	608	598	258	667	601	204	263	0	0	206	0	0
Stage 1	264	264	-	332	332	-	-	-	-	-	-	-
Stage 2	344	334	-	335	269	-	-	-	-	-	-	-
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	408	416	781	372	414	837	1301	-	-	1365	-	-
Stage 1	741	690	-	681	644	-	-	-	-	-	-	-
Stage 2	671	643	-	679	687	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	373	391	781	287	390	837	1301	-	-	1365	-	-
Mov Cap-2 Maneuver	373	391	-	287	390	-	-	-	-	-	-	-
Stage 1	700	688	-	643	608	-	-	-	-	-	-	-
Stage 2	610	607	-	556	685	-	-	-	-	-	-	-

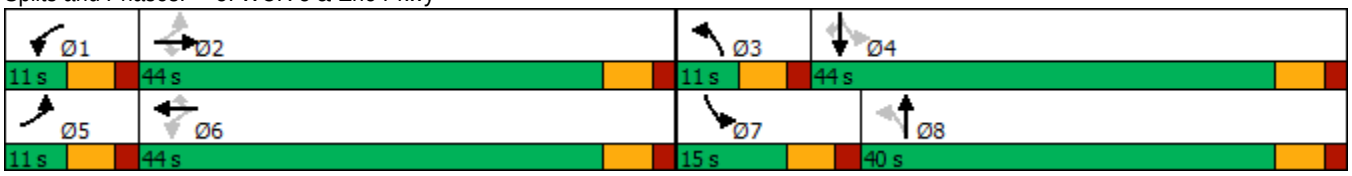
Approach	EB	WB	NB	SB
HCM Control Delay, s	13.4	15.2	1.9	0.1
HCM LOS	B	C		

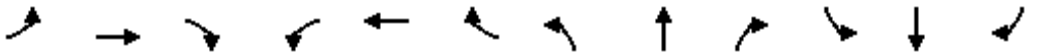
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1301	-	-	591	387	1365	-	-
HCM Lane V/C Ratio	0.049	-	-	0.273	0.085	0.002	-	-
HCM Control Delay (s)	7.9	0	-	13.4	15.2	7.6	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1.1	0.3	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	117	705	157	18	415	212	119	214	208	170	96
Future Volume (vph)	117	705	157	18	415	212	119	214	208	170	96
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8	7	4	
Permitted Phases	2		2	6		6	8		4		4
Detector Phase	5	2	2	1	6	6	3	8	7	4	4
Switch Phase											
Minimum Initial (s)	5.0	25.0	25.0	5.0	25.0	25.0	5.0	8.0	5.0	8.0	8.0
Minimum Split (s)	11.0	36.0	36.0	11.0	36.0	36.0	11.0	40.0	11.0	40.0	40.0
Total Split (s)	11.0	44.0	44.0	11.0	44.0	44.0	11.0	40.0	15.0	44.0	44.0
Total Split (%)	10.0%	40.0%	40.0%	10.0%	40.0%	40.0%	10.0%	36.4%	13.6%	40.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	46.9	45.0	45.0	43.1	38.1	38.1	24.7	19.7	32.7	23.7	23.7
Actuated g/C Ratio	0.49	0.47	0.47	0.45	0.40	0.40	0.26	0.21	0.34	0.25	0.25
v/c Ratio	0.37	0.89	0.21	0.12	0.62	0.30	0.39	0.80	0.84	0.21	0.21
Control Delay	17.8	40.0	5.8	15.4	28.6	4.1	26.3	50.3	50.8	28.7	2.6
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	17.8	40.0	5.8	15.4	28.6	4.1	26.3	50.3	50.8	28.7	2.6
LOS	B	D	A	B	C	A	C	D	D	C	A
Approach Delay		31.8			20.2			43.0		33.2	
Approach LOS		C			C			D		C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 95.9	
Natural Cycle: 110	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 30.9	Intersection LOS: C
Intersection Capacity Utilization 87.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: WCR 5 & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	705	157	18	415	212	119	214	62	208	170	96
Future Volume (veh/h)	117	705	157	18	415	212	119	214	62	208	170	96
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	129	775	173	20	456	233	131	235	68	229	187	105
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	329	812	688	135	754	639	382	271	78	279	840	375
Arrive On Green	0.05	0.43	0.43	0.02	0.40	0.40	0.05	0.19	0.19	0.10	0.24	0.24
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	1394	403	1781	3554	1585
Grp Volume(v), veh/h	129	775	173	20	456	233	131	0	303	229	187	105
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	0	1798	1781	1777	1585
Q Serve(g_s), s	4.0	37.7	6.5	0.6	18.2	9.7	5.0	0.0	15.4	9.0	4.0	5.1
Cycle Q Clear(g_c), s	4.0	37.7	6.5	0.6	18.2	9.7	5.0	0.0	15.4	9.0	4.0	5.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.22	1.00		1.00
Lane Grp Cap(c), veh/h	329	812	688	135	754	639	382	0	349	279	840	375
V/C Ratio(X)	0.39	0.95	0.25	0.15	0.61	0.36	0.34	0.00	0.87	0.82	0.22	0.28
Avail Cap(c_a), veh/h	329	812	688	191	754	639	382	0	648	279	1432	639
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.2	25.8	16.9	22.4	22.2	19.7	28.9	0.0	36.8	30.0	29.0	29.4
Incr Delay (d2), s/veh	0.3	22.2	0.9	0.2	3.6	1.6	0.2	0.0	2.6	16.3	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	19.6	2.3	0.2	7.9	3.6	2.3	0.0	6.6	5.2	1.6	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.4	47.9	17.8	22.6	25.8	21.3	29.1	0.0	39.4	46.3	29.1	29.6
LnGrp LOS	B	D	B	C	C	C	C	A	D	D	C	C
Approach Vol, veh/h		1077			709			434			521	
Approach Delay, s/veh		39.4			24.2			36.3			36.7	
Approach LOS		D			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	47.0	11.0	28.3	11.0	44.0	15.0	24.3
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	38.0	5.0	38.0	5.0	38.0	9.0	34.0
Max Q Clear Time (g_c+I1), s	2.6	39.7	7.0	7.1	6.0	20.2	11.0	17.4
Green Ext Time (p_c), s	0.0	0.0	0.0	0.8	0.0	4.5	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	34.5
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	849	7	8	689	0	23
Future Vol, veh/h	849	7	8	689	0	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	110	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	903	7	9	733	0	24

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	910	0	-	907
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.12	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.218	-	-	3.318
Pot Cap-1 Maneuver	-	-	748	-	0	334
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	748	-	-	334
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	16.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	334	-	-	748	-
HCM Lane V/C Ratio	0.073	-	-	0.011	-
HCM Control Delay (s)	16.6	-	-	9.9	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	862	3	12	687	1	12
Future Vol, veh/h	862	3	12	687	1	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	907	3	13	723	1	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	910	0	1658	909
Stage 1	-	-	-	-	909	-
Stage 2	-	-	-	-	749	-
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	-	-	748	-	107	333
Stage 1	-	-	-	-	393	-
Stage 2	-	-	-	-	467	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	748	-	104	333
Mov Cap-2 Maneuver	-	-	-	-	104	-
Stage 1	-	-	-	-	393	-
Stage 2	-	-	-	-	453	-

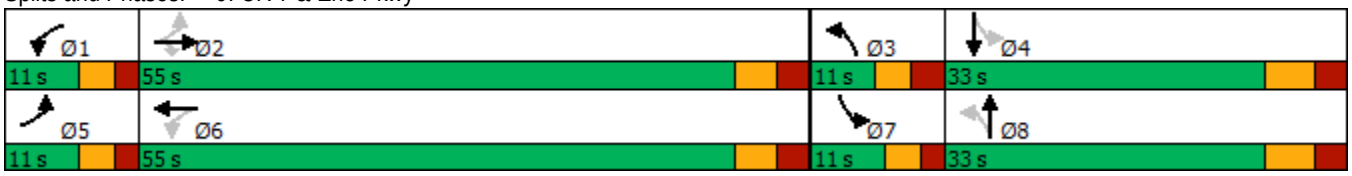
Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	16.2
HCM LOS			C

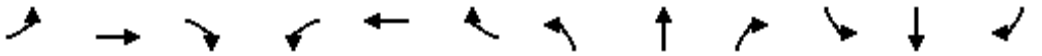
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	333	-	-	748	-
HCM Lane V/C Ratio	0.038	-	-	0.017	-
HCM Control Delay (s)	16.2	-	-	9.9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	32	752	80	20	525	86	154	113	71
Future Volume (vph)	32	752	80	20	525	86	154	113	71
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6	3	8	7	4
Permitted Phases	2		2	6		8		4	
Detector Phase	5	2	2	1	6	3	8	7	4
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	10.0	32.3	32.3	10.0	32.3	10.8	32.8	10.0	32.8
Total Split (s)	11.0	55.0	55.0	11.0	55.0	11.0	33.0	11.0	33.0
Total Split (%)	10.0%	50.0%	50.0%	10.0%	50.0%	10.0%	30.0%	10.0%	30.0%
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	2.8	2.0	2.8
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	6.3	6.3	5.0	6.3	5.8	6.8	5.0	6.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	None	None	None	None
Act Effct Green (s)	54.8	51.3	51.3	53.9	49.2	23.1	16.8	25.8	19.4
Actuated g/C Ratio	0.57	0.53	0.53	0.56	0.51	0.24	0.17	0.27	0.20
v/c Ratio	0.10	0.82	0.09	0.10	0.66	0.28	0.71	0.46	0.27
Control Delay	10.3	29.6	0.6	10.7	24.0	28.5	47.8	32.3	32.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.3	29.6	0.6	10.7	24.0	28.5	47.8	32.3	32.1
LOS	B	C	A	B	C	C	D	C	C
Approach Delay		26.2			23.5		42.3		32.2
Approach LOS		C			C		D		C

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 96.5	
Natural Cycle: 100	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 28.5	Intersection LOS: C
Intersection Capacity Utilization 72.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 9: CR 7 & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	752	80	20	525	56	86	154	59	113	71	23
Future Volume (veh/h)	32	752	80	20	525	56	86	154	59	113	71	23
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	34	809	86	22	565	60	92	166	63	122	76	25
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	336	968	820	210	847	90	307	200	76	222	208	69
Arrive On Green	0.03	0.52	0.52	0.02	0.51	0.51	0.05	0.15	0.15	0.06	0.15	0.15
Sat Flow, veh/h	1781	1870	1585	1781	1662	177	1781	1292	490	1781	1347	443
Grp Volume(v), veh/h	34	809	86	22	0	625	92	0	229	122	0	101
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1839	1781	0	1782	1781	0	1791
Q Serve(g_s), s	0.9	35.1	2.6	0.6	0.0	24.1	4.1	0.0	11.9	5.5	0.0	4.8
Cycle Q Clear(g_c), s	0.9	35.1	2.6	0.6	0.0	24.1	4.1	0.0	11.9	5.5	0.0	4.8
Prop In Lane	1.00		1.00	1.00		0.10	1.00		0.28	1.00		0.25
Lane Grp Cap(c), veh/h	336	968	820	210	0	937	307	0	276	222	0	277
V/C Ratio(X)	0.10	0.84	0.10	0.10	0.00	0.67	0.30	0.00	0.83	0.55	0.00	0.36
Avail Cap(c_a), veh/h	393	968	820	280	0	937	307	0	489	222	0	491
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.5	19.6	11.8	17.0	0.0	17.4	31.6	0.0	39.2	32.2	0.0	36.2
Incr Delay (d2), s/veh	0.1	8.5	0.3	0.2	0.0	3.8	0.5	0.0	6.4	2.9	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	15.1	0.9	0.2	0.0	9.7	1.7	0.0	5.4	2.4	0.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.6	28.1	12.0	17.2	0.0	21.2	32.2	0.0	45.5	35.1	0.0	37.0
LnGrp LOS	B	C	B	B	A	C	C	A	D	D	A	D
Approach Vol, veh/h		929			647			321			223	
Approach Delay, s/veh		26.1			21.0			41.7			36.0	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	55.8	11.0	21.6	8.0	55.0	11.0	21.6
Change Period (Y+Rc), s	5.0	* 6.3	* 5.8	* 6.8	5.0	* 6.3	5.0	* 6.8
Max Green Setting (Gmax), s	6.0	* 49	* 5.2	* 26	6.0	* 49	6.0	* 26
Max Q Clear Time (g_c+I1), s	2.6	37.1	6.1	6.8	2.9	26.1	7.5	13.9
Green Ext Time (p_c), s	0.0	4.2	0.0	0.4	0.0	3.7	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	27.9
HCM 6th LOS	C

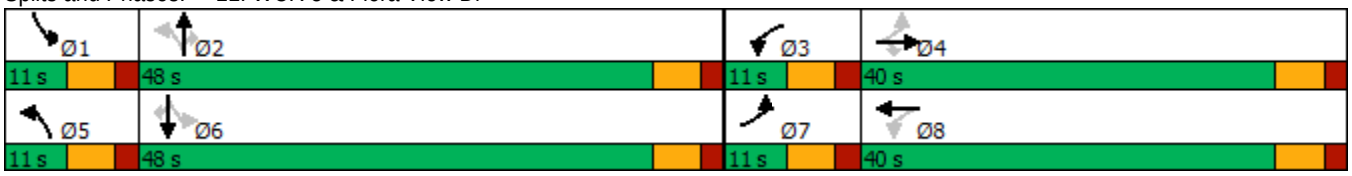
Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	2	14	52	31	9	56	167	39	18	178	3
Future Volume (vph)	2	14	52	31	9	56	167	39	18	178	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	10.0	10.0	5.0	10.0	5.0	25.0	25.0	5.0	25.0	25.0
Minimum Split (s)	11.0	40.0	40.0	11.0	40.0	11.0	36.0	36.0	11.0	36.0	36.0
Total Split (s)	11.0	40.0	40.0	11.0	40.0	11.0	48.0	48.0	11.0	48.0	48.0
Total Split (%)	10.0%	36.4%	36.4%	10.0%	36.4%	10.0%	43.6%	43.6%	10.0%	43.6%	43.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	11.7	10.2	10.2	13.9	14.2	52.6	52.3	52.3	50.2	47.9	47.9
Actuated g/C Ratio	0.15	0.13	0.13	0.18	0.18	0.66	0.66	0.66	0.63	0.60	0.60
v/c Ratio	0.01	0.07	0.19	0.16	0.09	0.09	0.17	0.04	0.03	0.19	0.00
Control Delay	25.0	34.7	1.3	27.3	19.1	6.7	10.0	0.1	6.7	11.9	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	25.0	34.7	1.3	27.3	19.1	6.7	10.0	0.1	6.7	11.9	0.0
LOS	C	C	A	C	B	A	A	A	A	B	A
Approach Delay		8.8			23.7		7.8			11.2	
Approach LOS		A			C		A			B	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 79.2	
Natural Cycle: 100	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.19	
Intersection Signal Delay: 10.6	Intersection LOS: B
Intersection Capacity Utilization 48.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 11: WCR 5 & Flora View Dr



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	14	52	31	9	15	56	167	39	18	178	3
Future Volume (veh/h)	2	14	52	31	9	15	56	167	39	18	178	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	2	17	63	38	11	18	68	204	48	22	217	4
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	248	210	178	288	92	151	693	1002	849	671	958	811
Arrive On Green	0.00	0.11	0.11	0.04	0.14	0.14	0.05	0.54	0.54	0.02	0.51	0.51
Sat Flow, veh/h	1781	1870	1585	1781	638	1044	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	2	17	63	38	0	29	68	204	48	22	217	4
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1682	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.1	0.7	3.0	1.5	0.0	1.2	1.4	4.7	1.2	0.5	5.3	0.1
Cycle Q Clear(g_c), s	0.1	0.7	3.0	1.5	0.0	1.2	1.4	4.7	1.2	0.5	5.3	0.1
Prop In Lane	1.00		1.00	1.00		0.62	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	248	210	178	288	0	244	693	1002	849	671	958	811
V/C Ratio(X)	0.01	0.08	0.35	0.13	0.00	0.12	0.10	0.20	0.06	0.03	0.23	0.00
Avail Cap(c_a), veh/h	351	775	657	334	0	697	716	1002	849	737	958	811
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.2	32.6	33.7	30.5	0.0	30.5	8.4	9.9	9.1	9.0	11.1	9.8
Incr Delay (d2), s/veh	0.0	0.2	1.2	0.2	0.0	0.2	0.1	0.5	0.1	0.0	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.3	1.2	0.7	0.0	0.5	0.5	1.7	0.4	0.2	2.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.2	32.8	34.9	30.7	0.0	30.7	8.5	10.4	9.2	9.0	11.6	9.8
LnGrp LOS	C	C	C	C	A	C	A	B	A	A	B	A
Approach Vol, veh/h		82			67			320			243	
Approach Delay, s/veh		34.4			30.7			9.8			11.3	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	50.0	8.9	15.2	9.9	48.0	6.2	17.9
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	42.0	5.0	34.0	5.0	42.0	5.0	34.0
Max Q Clear Time (g_c+I1), s	2.5	6.7	3.5	5.0	3.4	7.3	2.1	3.2
Green Ext Time (p_c), s	0.0	1.2	0.0	0.2	0.0	1.2	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	15.1
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1	2	229	496	1
Future Vol, veh/h	0	1	2	229	496	1
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	2	236	511	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	752	512	512	0	-	0
Stage 1	512	-	-	-	-	-
Stage 2	240	-	-	-	-	-
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	378	562	1053	-	-	-
Stage 1	602	-	-	-	-	-
Stage 2	800	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	377	562	1053	-	-	-
Mov Cap-2 Maneuver	377	-	-	-	-	-
Stage 1	601	-	-	-	-	-
Stage 2	800	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.4	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1053	-	562	-	-
HCM Lane V/C Ratio	0.002	-	0.002	-	-
HCM Control Delay (s)	8.4	0	11.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	48	20	284	42	13	312
Future Vol, veh/h	48	20	284	42	13	312
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	-	-	0	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	22	312	46	14	343

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	512	156	0	0	358	0
Stage 1	312	-	-	-	-	-
Stage 2	200	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	491	862	-	-	1197	-
Stage 1	715	-	-	-	-	-
Stage 2	814	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	485	862	-	-	1197	-
Mov Cap-2 Maneuver	485	-	-	-	-	-
Stage 1	715	-	-	-	-	-
Stage 2	804	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.5	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	557	1197	-
HCM Lane V/C Ratio	-	-	0.134	0.012	-
HCM Control Delay (s)	-	-	12.5	8	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.5	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	35	4	108	51	12	169	266	20	40	279	41
Future Volume (vph)	35	4	108	51	12	169	266	20	40	279	41
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	20.0	20.0	10.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0
Total Split (s)	12.0	30.0	30.0	12.0	30.0	12.0	66.0	66.0	12.0	66.0	66.0
Total Split (%)	10.0%	25.0%	25.0%	10.0%	25.0%	10.0%	55.0%	55.0%	10.0%	55.0%	55.0%
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)	12.4	7.1	7.1	13.5	9.4	70.6	66.6	66.6	67.4	61.2	61.2
Actuated g/C Ratio	0.12	0.07	0.07	0.14	0.09	0.71	0.67	0.67	0.68	0.61	0.61
v/c Ratio	0.19	0.03	0.53	0.27	0.22	0.24	0.12	0.02	0.06	0.14	0.04
Control Delay	36.8	44.0	17.8	38.4	25.5	5.6	7.9	0.1	5.0	9.1	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	36.8	44.0	17.8	38.4	25.5	5.6	7.9	0.1	5.0	9.1	0.1
LOS	D	D	B	D	C	A	A	A	A	A	A
Approach Delay		23.0			33.0		6.7			7.6	
Approach LOS		C			C		A			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 99.7	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 11.5	Intersection LOS: B
Intersection Capacity Utilization 39.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 21: WCR 5 & Colliers Pkwy/Erie HS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	4	108	51	12	25	169	266	20	40	279	41
Future Volume (veh/h)	35	4	108	51	12	25	169	266	20	40	279	41
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	4	117	55	13	27	184	289	22	43	303	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	238	177	150	272	55	114	791	2246	1002	787	2162	964
Arrive On Green	0.03	0.09	0.09	0.04	0.10	0.10	0.06	0.63	0.63	0.03	0.61	0.61
Sat Flow, veh/h	1781	1870	1585	1781	542	1126	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	38	4	117	55	0	40	184	289	22	43	303	45
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1668	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	1.9	0.2	7.2	2.8	0.0	2.2	3.8	3.3	0.5	0.9	3.7	1.1
Cycle Q Clear(g_c), s	1.9	0.2	7.2	2.8	0.0	2.2	3.8	3.3	0.5	0.9	3.7	1.1
Prop In Lane	1.00		1.00	1.00		0.68	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	238	177	150	272	0	169	791	2246	1002	787	2162	964
V/C Ratio(X)	0.16	0.02	0.78	0.20	0.00	0.24	0.23	0.13	0.02	0.05	0.14	0.05
Avail Cap(c_a), veh/h	304	466	395	327	0	416	812	2246	1002	850	2162	964
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.0	41.2	44.4	38.8	0.0	41.5	6.3	7.4	6.9	6.5	8.4	7.9
Incr Delay (d2), s/veh	0.3	0.1	8.5	0.4	0.0	0.7	0.1	0.1	0.0	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.1	3.2	1.2	0.0	0.9	1.2	1.1	0.2	0.3	1.3	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.4	41.2	52.8	39.2	0.0	42.2	6.4	7.5	6.9	6.6	8.5	8.0
LnGrp LOS	D	D	D	D	A	D	A	A	A	A	A	A
Approach Vol, veh/h		159			95			495			391	
Approach Delay, s/veh		49.3			40.5			7.1			8.3	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	68.4	8.9	14.5	10.9	66.0	8.3	15.1
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	61.0	7.0	25.0	7.0	61.0	7.0	25.0
Max Q Clear Time (g_c+I1), s	2.9	5.3	4.8	9.2	5.8	5.7	3.9	4.2
Green Ext Time (p_c), s	0.0	1.9	0.0	0.3	0.1	2.0	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	16.2
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	29	14	0	3	0	451	192	18	410	10
Future Vol, veh/h	0	0	29	14	0	3	0	451	192	18	410	10
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	-	-	0	-	-	-	-	-	250	125	-	120
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	0	0	34	16	0	3	0	524	223	21	477	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	239	805	1055	262	-	0	0	747	0	0
Stage 1	-	-	-	524	524	-	-	-	-	-	-	-
Stage 2	-	-	-	281	531	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	7.54	6.54	6.94	-	-	-	4.14	-	-
Critical Hdwy Stg 1	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	3.52	4.02	3.32	-	-	-	2.22	-	-
Pot Cap-1 Maneuver	0	0	762	274	224	737	0	-	-	857	-	-
Stage 1	0	0	-	504	528	-	0	-	-	-	-	-
Stage 2	0	0	-	702	524	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	762	257	218	737	-	-	-	857	-	-
Mov Cap-2 Maneuver	-	-	-	257	218	-	-	-	-	-	-	-
Stage 1	-	-	-	504	528	-	-	-	-	-	-	-
Stage 2	-	-	-	654	511	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.9	18.3	0	0.4
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	762	290	857	-	-
HCM Lane V/C Ratio	-	-	0.044	0.068	0.024	-	-
HCM Control Delay (s)	-	-	9.9	18.3	9.3	-	-
HCM Lane LOS	-	-	A	C	A	-	-
HCM 95th %tile Q(veh)	-	-	0.1	0.2	0.1	-	-

Intersection	
Intersection Delay, s/veh	8.8
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	365	199	583	429
Demand Flow Rate, veh/h	372	203	595	437
Vehicles Circulating, veh/h	472	580	136	333
Vehicles Exiting, veh/h	298	151	708	450
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.8	7.9	8.5	8.9
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	372	203	595	437
Cap Entry Lane, veh/h	853	764	1201	983
Entry HV Adj Factor	0.981	0.980	0.979	0.982
Flow Entry, veh/h	365	199	583	429
Cap Entry, veh/h	837	749	1176	964
V/C Ratio	0.436	0.266	0.495	0.445
Control Delay, s/veh	9.8	7.9	8.5	8.9
LOS	A	A	A	A
95th %tile Queue, veh	2	1	3	2

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	8	31	76	8	60	4	71	175	2	3	329	16
Future Vol, veh/h	8	31	76	8	60	4	71	175	2	3	329	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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	32	78	8	62	4	73	180	2	3	339	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	713	681	347	735	688	181	355	0	0	182	0	0
Stage 1	353	353	-	327	327	-	-	-	-	-	-	-
Stage 2	360	328	-	408	361	-	-	-	-	-	-	-
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	347	373	696	335	369	862	1204	-	-	1393	-	-
Stage 1	664	631	-	686	648	-	-	-	-	-	-	-
Stage 2	658	647	-	620	626	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	282	347	696	262	343	862	1204	-	-	1393	-	-
Mov Cap-2 Maneuver	282	347	-	262	343	-	-	-	-	-	-	-
Stage 1	620	629	-	640	605	-	-	-	-	-	-	-
Stage 2	549	604	-	521	624	-	-	-	-	-	-	-

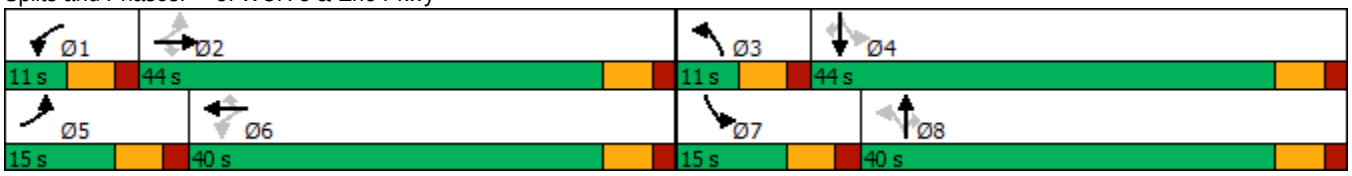
Approach	EB	WB	NB	SB
HCM Control Delay, s	14.3	18.4	2.3	0.1
HCM LOS	B	C		

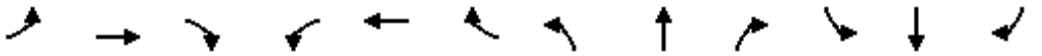
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1204	-	-	507	343	1393	-	-
HCM Lane V/C Ratio	0.061	-	-	0.234	0.216	0.002	-	-
HCM Control Delay (s)	8.2	0	-	14.3	18.4	7.6	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.9	0.8	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	300	721	214	80	840	305	266	311	37	324	292	298
Future Volume (vph)	300	721	214	80	840	305	266	311	37	324	292	298
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	25.0	25.0	5.0	25.0	25.0	5.0	8.0	8.0	5.0	8.0	8.0
Minimum Split (s)	11.0	36.0	36.0	11.0	36.0	36.0	11.0	40.0	40.0	11.0	40.0	40.0
Total Split (s)	15.0	44.0	44.0	11.0	40.0	40.0	11.0	40.0	40.0	15.0	44.0	44.0
Total Split (%)	13.6%	40.0%	40.0%	10.0%	36.4%	36.4%	10.0%	36.4%	36.4%	13.6%	40.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	47.6	40.5	40.5	39.1	34.1	34.1	19.9	14.9	14.9	27.9	18.9	18.9
Actuated g/C Ratio	0.52	0.44	0.44	0.43	0.37	0.37	0.22	0.16	0.16	0.31	0.21	0.21
v/c Ratio	1.36	1.00	0.31	0.52	1.39	0.45	1.16	0.62	0.11	1.22	0.46	0.76
Control Delay	210.8	60.8	8.2	24.5	209.3	6.0	135.7	40.0	0.6	151.4	33.3	29.5
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	210.8	60.8	8.2	24.5	209.3	6.0	135.7	40.0	0.6	151.4	33.3	29.5
LOS	F	E	A	C	F	A	F	D	A	F	C	C
Approach Delay		88.1			146.6			79.1			73.9	
Approach LOS		F			F			E			E	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 91.1	
Natural Cycle: 150	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.39	
Intersection Signal Delay: 101.4	Intersection LOS: F
Intersection Capacity Utilization 107.4%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 5: WCR 5 & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	300	721	214	80	840	305	266	311	37	324	292	298
Future Volume (veh/h)	300	721	214	80	840	305	266	311	37	324	292	298
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	345	829	246	92	966	351	306	357	43	372	336	343
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	243	749	635	162	664	563	297	732	327	358	881	393
Arrive On Green	0.09	0.40	0.40	0.05	0.36	0.36	0.05	0.21	0.21	0.09	0.25	0.25
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	345	829	246	92	966	351	306	357	43	372	336	343
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	9.0	38.3	10.5	3.1	34.0	17.6	5.0	8.5	2.1	9.0	7.5	19.9
Cycle Q Clear(g_c), s	9.0	38.3	10.5	3.1	34.0	17.6	5.0	8.5	2.1	9.0	7.5	19.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	243	749	635	162	664	563	297	732	327	358	881	393
V/C Ratio(X)	1.42	1.11	0.39	0.57	1.45	0.62	1.03	0.49	0.13	1.04	0.38	0.87
Avail Cap(c_a), veh/h	243	749	635	168	664	563	297	1262	563	358	1411	629
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.7	28.7	20.4	24.0	30.9	25.6	37.4	33.5	31.0	34.7	29.9	34.6
Incr Delay (d2), s/veh	212.1	66.2	1.8	2.4	212.7	5.1	60.2	0.2	0.1	57.8	0.1	4.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.7	28.9	4.0	1.3	53.0	7.1	9.5	3.6	0.8	9.7	3.1	7.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	237.8	94.9	22.1	26.4	243.6	30.7	97.6	33.7	31.1	92.5	30.0	39.3
LnGrp LOS	F	F	C	C	F	C	F	C	C	F	C	D
Approach Vol, veh/h		1420			1409			706			1051	
Approach Delay, s/veh		117.0			176.4			61.2			55.2	
Approach LOS		F			F			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.7	44.3	11.0	29.7	15.0	40.0	15.0	25.7
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	38.0	5.0	38.0	9.0	34.0	9.0	34.0
Max Q Clear Time (g_c+I1), s	5.1	40.3	7.0	21.9	11.0	36.0	11.0	10.5
Green Ext Time (p_c), s	0.0	0.0	0.0	1.8	0.0	0.0	0.0	1.5

Intersection Summary	
HCM 6th Ctrl Delay	112.5
HCM 6th LOS	F

Intersection	
Int Delay, s/veh	2.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1059	23	45	1224	1	102
Future Vol, veh/h	1059	23	45	1224	1	102
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	110	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1261	27	54	1457	1	121

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1288	0	2826	1261
Stage 1	-	-	-	-	1261	-
Stage 2	-	-	-	-	1565	-
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	-	-	538	-	20	208
Stage 1	-	-	-	-	267	-
Stage 2	-	-	-	-	189	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	538	-	18	208
Mov Cap-2 Maneuver	-	-	-	-	18	-
Stage 1	-	-	-	-	267	-
Stage 2	-	-	-	-	170	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	44.1
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	208	-	-	538	-
HCM Lane V/C Ratio	0.584	-	-	0.1	-
HCM Control Delay (s)	44.1	-	-	12.4	-
HCM Lane LOS	E	-	-	B	-
HCM 95th %tile Q(veh)	3.2	-	-	0.3	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1013	148	28	1043	226	179
Future Volume (vph)	1013	148	28	1043	226	179
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	15.0	15.0	5.0	15.0	15.0	15.0
Minimum Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (s)	68.0	68.0	12.0	80.0	30.0	30.0
Total Split (%)	61.8%	61.8%	10.9%	72.7%	27.3%	27.3%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Max	Max	None	Max	None	None
Act Effct Green (s)	68.4	68.4	75.1	75.1	20.3	20.3
Actuated g/C Ratio	0.65	0.65	0.71	0.71	0.19	0.19
v/c Ratio	0.96	0.16	0.19	0.90	0.76	0.46
Control Delay	39.2	4.6	7.8	24.7	55.6	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.2	4.6	7.8	24.7	55.6	12.0
LOS	D	A	A	C	E	B
Approach Delay	34.8			24.3	36.3	
Approach LOS	C			C	D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 105.4	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 30.8	Intersection LOS: C
Intersection Capacity Utilization 75.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 7: Waterford St & Erie Pkwy

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1013	148	28	1043	226	179
Future Volume (veh/h)	1013	148	28	1043	226	179
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1164	170	32	1199	260	206
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1222	1036	156	1368	305	272
Arrive On Green	0.65	0.65	0.03	0.73	0.17	0.17
Sat Flow, veh/h	1870	1585	1781	1870	1781	1585
Grp Volume(v), veh/h	1164	170	32	1199	260	206
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1781	1585
Q Serve(g_s), s	58.6	4.3	0.6	49.2	14.5	12.7
Cycle Q Clear(g_c), s	58.6	4.3	0.6	49.2	14.5	12.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1222	1036	156	1368	305	272
V/C Ratio(X)	0.95	0.16	0.21	0.88	0.85	0.76
Avail Cap(c_a), veh/h	1222	1036	225	1368	434	386
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.3	6.9	24.1	10.3	41.2	40.5
Incr Delay (d2), s/veh	16.6	0.3	0.6	8.2	10.8	5.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	24.4	1.3	0.5	16.1	7.2	5.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	33.0	7.2	24.7	18.5	52.1	45.8
LnGrp LOS	C	A	C	B	D	D
Approach Vol, veh/h	1334			1231	466	
Approach Delay, s/veh	29.7			18.6	49.3	
Approach LOS	C			B	D	

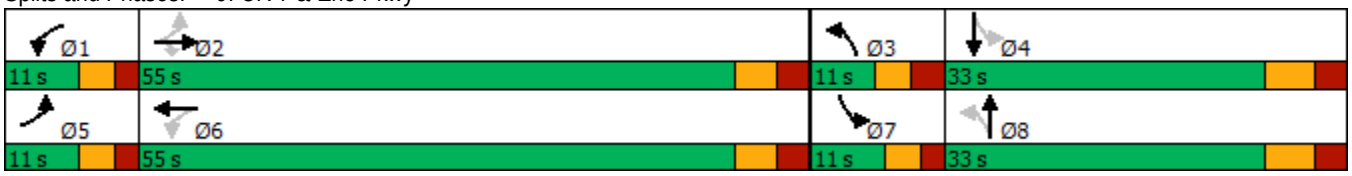
Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	8.0	72.0				80.0	22.6
Change Period (Y+Rc), s	5.0	5.0				5.0	5.0
Max Green Setting (Gmax), s	7.0	63.0				75.0	25.0
Max Q Clear Time (g_c+I1), s	2.6	60.6				51.2	16.5
Green Ext Time (p_c), s	0.0	1.8				10.8	1.0

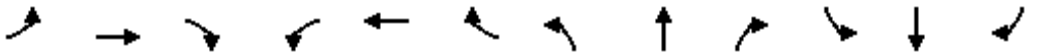
Intersection Summary							
HCM 6th Ctrl Delay			28.2				
HCM 6th LOS			C				

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	55	1091	46	116	860	116	102	153	163
Future Volume (vph)	55	1091	46	116	860	116	102	153	163
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6	3	8	7	4
Permitted Phases	2		2	6		8		4	
Detector Phase	5	2	2	1	6	3	8	7	4
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	10.0	32.3	32.3	10.0	32.3	10.8	32.8	10.0	32.8
Total Split (s)	11.0	55.0	55.0	11.0	55.0	11.0	33.0	11.0	33.0
Total Split (%)	10.0%	50.0%	50.0%	10.0%	50.0%	10.0%	30.0%	10.0%	30.0%
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	2.8	2.0	2.8
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	6.3	6.3	5.0	6.3	5.8	6.8	5.0	6.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	None	None	None	None
Act Effct Green (s)	56.0	48.8	48.8	57.2	51.2	25.2	19.0	26.8	19.0
Actuated g/C Ratio	0.54	0.47	0.47	0.56	0.50	0.24	0.18	0.26	0.18
v/c Ratio	0.32	1.26	0.06	0.67	1.06	0.54	0.37	0.44	0.76
Control Delay	15.3	153.5	0.1	36.2	75.9	37.9	36.4	32.0	50.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	153.5	0.1	36.2	75.9	37.9	36.4	32.0	50.7
LOS	B	F	A	D	E	D	D	C	D
Approach Delay		141.2			71.6		37.1		43.8
Approach LOS		F			E		D		D

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 103	
Natural Cycle: 140	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.26	
Intersection Signal Delay: 93.3	Intersection LOS: F
Intersection Capacity Utilization 104.6%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 9: CR 7 & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	1091	46	116	860	92	116	102	23	153	163	95
Future Volume (veh/h)	55	1091	46	116	860	92	116	102	23	153	163	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	56	1113	47	118	878	94	118	104	23	156	166	97
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	142	907	768	163	824	88	196	259	57	320	193	113
Arrive On Green	0.04	0.48	0.48	0.05	0.50	0.50	0.05	0.17	0.17	0.06	0.17	0.17
Sat Flow, veh/h	1781	1870	1585	1781	1661	178	1781	1483	328	1781	1107	647
Grp Volume(v), veh/h	56	1113	47	118	0	972	118	0	127	156	0	263
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1838	1781	0	1811	1781	0	1754
Q Serve(g_s), s	1.6	48.7	1.6	3.3	0.0	49.9	5.2	0.0	6.3	6.0	0.0	14.6
Cycle Q Clear(g_c), s	1.6	48.7	1.6	3.3	0.0	49.9	5.2	0.0	6.3	6.0	0.0	14.6
Prop In Lane	1.00		1.00	1.00		0.10	1.00		0.18	1.00		0.37
Lane Grp Cap(c), veh/h	142	907	768	163	0	913	196	0	316	320	0	306
V/C Ratio(X)	0.40	1.23	0.06	0.73	0.00	1.07	0.60	0.00	0.40	0.49	0.00	0.86
Avail Cap(c_a), veh/h	178	907	768	178	0	913	196	0	472	320	0	457
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.6	25.9	13.7	23.4	0.0	25.3	34.1	0.0	36.8	33.6	0.0	40.3
Incr Delay (d2), s/veh	1.8	112.2	0.2	12.5	0.0	48.7	5.0	0.0	0.8	1.2	0.0	10.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	46.9	0.6	1.7	0.0	30.9	2.5	0.0	2.7	0.5	0.0	6.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.3	138.1	13.9	35.9	0.0	74.0	39.2	0.0	37.6	34.7	0.0	50.5
LnGrp LOS	C	F	B	D	A	F	D	A	D	C	A	D
Approach Vol, veh/h		1216			1090			245			419	
Approach Delay, s/veh		128.1			69.9			38.4			44.6	
Approach LOS		F			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.1	55.0	11.0	24.3	9.0	56.2	11.0	24.3
Change Period (Y+Rc), s	5.0	* 6.3	* 5.8	* 6.8	5.0	* 6.3	5.0	* 6.8
Max Green Setting (Gmax), s	6.0	* 49	* 5.2	* 26	6.0	* 49	6.0	* 26
Max Q Clear Time (g_c+I1), s	5.3	50.7	7.2	16.6	3.6	51.9	8.0	8.3
Green Ext Time (p_c), s	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.5

Intersection Summary	
HCM 6th Ctrl Delay	87.6
HCM 6th LOS	F

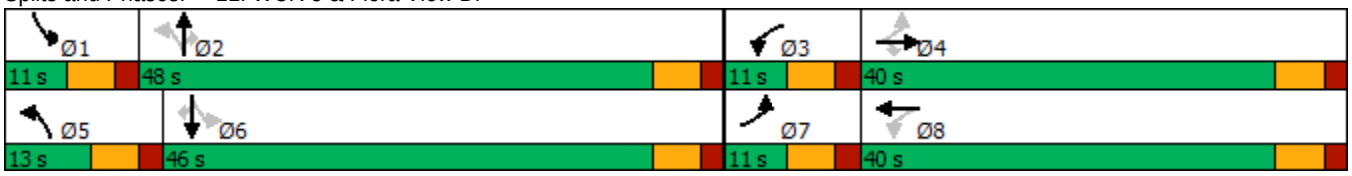
Notes

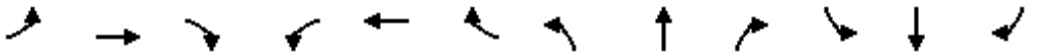
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	20	88	175	83	33	118	404	127	90	451	14
Future Volume (vph)	20	88	175	83	33	118	404	127	90	451	14
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	10.0	10.0	5.0	10.0	5.0	25.0	25.0	5.0	25.0	25.0
Minimum Split (s)	11.0	40.0	40.0	11.0	40.0	11.0	36.0	36.0	11.0	36.0	36.0
Total Split (s)	11.0	40.0	40.0	11.0	40.0	13.0	48.0	48.0	11.0	46.0	46.0
Total Split (%)	10.0%	36.4%	36.4%	10.0%	36.4%	11.8%	43.6%	43.6%	10.0%	41.8%	41.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	17.8	12.8	12.8	21.5	19.6	49.0	42.1	42.1	45.1	40.1	40.1
Actuated g/C Ratio	0.20	0.14	0.14	0.24	0.22	0.55	0.47	0.47	0.51	0.45	0.45
v/c Ratio	0.07	0.55	0.48	0.49	0.30	0.57	0.76	0.25	0.60	0.90	0.02
Control Delay	24.4	43.3	9.7	33.6	19.5	22.3	27.1	4.2	21.0	38.5	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	24.4	43.3	9.7	33.6	19.5	22.3	27.1	4.2	21.0	38.5	0.1
LOS	C	D	A	C	B	C	C	A	C	D	A
Approach Delay		24.5			26.9		21.7			35.0	
Approach LOS		C			C		C			D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 88.9	
Natural Cycle: 110	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 27.4	Intersection LOS: C
Intersection Capacity Utilization 56.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 11: WCR 5 & Flora View Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	88	175	83	33	42	118	404	127	90	451	14
Future Volume (veh/h)	20	88	175	83	33	42	118	404	127	90	451	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	21	147	186	138	55	70	126	673	212	150	752	15
Peak Hour Factor	0.94	0.60	0.94	0.60	0.60	0.60	0.94	0.60	0.60	0.60	0.60	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	272	282	239	262	138	175	259	878	744	287	877	743
Arrive On Green	0.02	0.15	0.15	0.06	0.18	0.18	0.06	0.47	0.47	0.06	0.47	0.47
Sat Flow, veh/h	1781	1870	1585	1781	748	951	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	21	147	186	138	0	125	126	673	212	150	752	15
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1699	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.9	6.5	10.1	5.0	0.0	5.8	3.2	26.7	7.3	3.9	32.0	0.5
Cycle Q Clear(g_c), s	0.9	6.5	10.1	5.0	0.0	5.8	3.2	26.7	7.3	3.9	32.0	0.5
Prop In Lane	1.00		1.00	1.00		0.56	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	272	282	239	262	0	313	259	878	744	287	877	743
V/C Ratio(X)	0.08	0.52	0.78	0.53	0.00	0.40	0.49	0.77	0.29	0.52	0.86	0.02
Avail Cap(c_a), veh/h	331	710	602	262	0	645	298	878	744	287	877	743
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.0	35.0	36.6	31.8	0.0	32.2	17.8	19.7	14.6	16.3	21.1	12.8
Incr Delay (d2), s/veh	0.1	1.5	5.4	1.9	0.0	0.8	1.4	6.4	1.0	1.7	10.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	3.0	4.2	0.5	0.0	2.4	1.3	12.2	2.7	1.6	15.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.1	36.5	41.9	33.7	0.0	33.0	19.2	26.1	15.5	18.0	31.8	12.8
LnGrp LOS	C	D	D	C	A	C	B	C	B	B	C	B
Approach Vol, veh/h		354			263			1011			917	
Approach Delay, s/veh		39.0			33.4			23.0			29.2	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	48.0	11.0	19.5	11.1	47.9	8.0	22.5
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	42.0	5.0	34.0	7.0	40.0	5.0	34.0
Max Q Clear Time (g_c+I1), s	5.9	28.7	7.0	12.1	5.2	34.0	2.9	7.8
Green Ext Time (p_c), s	0.0	4.4	0.0	1.4	0.0	2.6	0.0	0.7

Intersection Summary	
HCM 6th Ctrl Delay	28.5
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	1	248	411	2
Future Vol, veh/h	0	0	1	248	411	2
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	1	285	472	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	760	473	474	0	-	0
Stage 1	473	-	-	-	-	-
Stage 2	287	-	-	-	-	-
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	374	591	1088	-	-	-
Stage 1	627	-	-	-	-	-
Stage 2	762	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	374	591	1088	-	-	-
Mov Cap-2 Maneuver	374	-	-	-	-	-
Stage 1	626	-	-	-	-	-
Stage 2	762	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1088	-	-	-	-
HCM Lane V/C Ratio	0.001	-	-	-	-
HCM Control Delay (s)	8.3	0	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	6	643	46	43	666
Future Vol, veh/h	4	6	643	46	43	666
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	-	-	0	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	7	784	56	52	812

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1294	392	0	0	840	0
Stage 1	784	-	-	-	-	-
Stage 2	510	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	154	607	-	-	791	-
Stage 1	410	-	-	-	-	-
Stage 2	568	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	144	607	-	-	791	-
Mov Cap-2 Maneuver	144	-	-	-	-	-
Stage 1	410	-	-	-	-	-
Stage 2	531	-	-	-	-	-

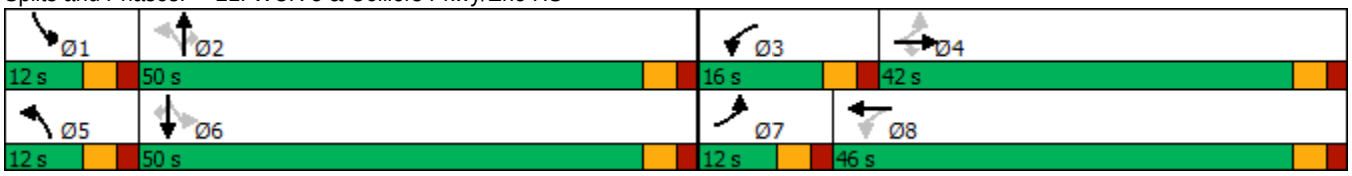
Approach	WB	NB	SB
HCM Control Delay, s	19.2	0	0.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	266	791	-
HCM Lane V/C Ratio	-	-	0.046	0.066	-
HCM Control Delay (s)	-	-	19.2	9.9	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	182	131	207	222	67	47	417	112	129	514	27
Future Volume (vph)	182	131	207	222	67	47	417	112	129	514	27
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	15.0	15.0	5.0	10.0	5.0	15.0	15.0	5.0	10.0	10.0
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0
Total Split (s)	12.0	42.0	42.0	16.0	46.0	12.0	50.0	50.0	12.0	50.0	50.0
Total Split (%)	10.0%	35.0%	35.0%	13.3%	38.3%	10.0%	41.7%	41.7%	10.0%	41.7%	41.7%
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)	24.6	17.6	17.6	32.6	21.6	51.7	45.0	45.0	53.2	47.6	47.6
Actuated g/C Ratio	0.24	0.17	0.17	0.32	0.21	0.51	0.45	0.45	0.53	0.47	0.47
v/c Ratio	0.93	0.58	0.69	0.94	0.57	0.19	0.38	0.21	0.46	0.45	0.05
Control Delay	69.9	45.7	22.1	66.6	31.6	12.0	19.8	3.7	15.7	19.9	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	69.9	45.7	22.1	66.6	31.6	12.0	19.8	3.7	15.7	19.9	0.1
LOS	E	D	C	E	C	B	B	A	B	B	A
Approach Delay		44.8			52.1		16.1			18.3	
Approach LOS		D			D		B			B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 100.7	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 30.1	Intersection LOS: C
Intersection Capacity Utilization 61.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 21: WCR 5 & Colliers Pkwy/Erie HS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	182	131	207	222	67	90	47	417	112	129	514	27
Future Volume (veh/h)	182	131	207	222	67	90	47	417	112	129	514	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.94		0.89	0.96		0.91	0.97		0.98	0.99		0.91
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	264	190	300	322	97	130	68	604	162	187	745	39
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	352	452	339	380	191	255	329	1462	638	382	1547	627
Arrive On Green	0.06	0.24	0.24	0.10	0.28	0.28	0.04	0.41	0.41	0.06	0.44	0.44
Sat Flow, veh/h	1781	1870	1406	1781	685	919	1781	3554	1552	1781	3554	1441
Grp Volume(v), veh/h	264	190	300	322	0	227	68	604	162	187	745	39
Grp Sat Flow(s),veh/h/ln	1781	1870	1406	1781	0	1604	1781	1777	1552	1781	1777	1441
Q Serve(g_s), s	7.0	9.4	22.5	11.0	0.0	13.0	2.4	13.2	7.5	6.7	16.4	1.7
Cycle Q Clear(g_c), s	7.0	9.4	22.5	11.0	0.0	13.0	2.4	13.2	7.5	6.7	16.4	1.7
Prop In Lane	1.00		1.00	1.00		0.57	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	352	452	339	380	0	446	329	1462	638	382	1547	627
V/C Ratio(X)	0.75	0.42	0.88	0.85	0.00	0.51	0.21	0.41	0.25	0.49	0.48	0.06
Avail Cap(c_a), veh/h	352	632	475	380	0	601	371	1462	638	382	1547	627
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.2	35.0	40.0	32.8	0.0	33.2	18.1	22.8	21.2	17.9	22.1	17.9
Incr Delay (d2), s/veh	8.6	0.6	13.5	16.3	0.0	0.9	0.3	0.9	1.0	1.0	1.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	4.3	9.0	4.7	0.0	5.1	1.0	5.6	2.9	2.8	7.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.9	35.7	53.5	49.1	0.0	34.1	18.4	23.7	22.1	18.9	23.1	18.1
LnGrp LOS	D	D	D	D	A	C	B	C	C	B	C	B
Approach Vol, veh/h		754			549			834			971	
Approach Delay, s/veh		46.0			42.9			23.0			22.1	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	50.0	16.0	31.4	9.4	52.6	12.0	35.4
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	45.0	11.0	37.0	7.0	45.0	7.0	41.0
Max Q Clear Time (g_c+I1), s	8.7	15.2	13.0	24.5	4.4	18.4	9.0	15.0
Green Ext Time (p_c), s	0.0	5.2	0.0	1.9	0.0	5.8	0.0	1.5

Intersection Summary	
HCM 6th Ctrl Delay	31.8
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	49	3	0	38	0	582	334	101	862	3
Future Vol, veh/h	0	0	49	3	0	38	0	582	334	101	862	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	-	-	0	-	-	-	-	-	250	125	-	120
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	68	68	68	68	68	68	68	68	68	68	68	68
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	72	4	0	56	0	856	491	149	1268	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	634	1788	2426	428	-	0	0	1347	0	0
Stage 1	-	-	-	856	856	-	-	-	-	-	-	-
Stage 2	-	-	-	932	1570	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	7.54	6.54	6.94	-	-	-	4.14	-	-
Critical Hdwy Stg 1	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	3.52	4.02	3.32	-	-	-	2.22	-	-
Pot Cap-1 Maneuver	0	0	422	51	32	575	0	-	-	507	-	-
Stage 1	0	0	-	319	373	-	0	-	-	-	-	-
Stage 2	0	0	-	287	170	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	422	33	23	575	-	-	-	507	-	-
Mov Cap-2 Maneuver	-	-	-	33	23	-	-	-	-	-	-	-
Stage 1	-	-	-	319	373	-	-	-	-	-	-	-
Stage 2	-	-	-	168	120	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.3	22.9	0	1.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	422	261	507	-	-
HCM Lane V/C Ratio	-	-	0.171	0.231	0.293	-	-
HCM Control Delay (s)	-	-	15.3	22.9	15	-	-
HCM Lane LOS	-	-	C	C	C	-	-
HCM 95th %tile Q(veh)	-	-	0.6	0.9	1.2	-	-

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	247	120	492	518
Demand Flow Rate, veh/h	252	122	502	529
Vehicles Circulating, veh/h	522	484	166	274
Vehicles Exiting, veh/h	281	184	608	332
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.1	5.8	7.7	9.6
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	252	122	502	529
Cap Entry Lane, veh/h	810	842	1165	1043
Entry HV Adj Factor	0.981	0.986	0.980	0.980
Flow Entry, veh/h	247	120	492	518
Cap Entry, veh/h	795	830	1142	1023
V/C Ratio	0.311	0.145	0.431	0.507
Control Delay, s/veh	8.1	5.8	7.7	9.6
LOS	A	A	A	A
95th %tile Queue, veh	1	1	2	3

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	41	109	9	38	6	62	381	4	3	366	10
Future Vol, veh/h	20	41	109	9	38	6	62	381	4	3	366	10
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	47	124	10	43	7	70	433	5	3	416	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1029	1006	422	1089	1009	436	427	0	0	438	0	0
Stage 1	428	428	-	576	576	-	-	-	-	-	-	-
Stage 2	601	578	-	513	433	-	-	-	-	-	-	-
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	212	241	632	193	240	620	1132	-	-	1122	-	-
Stage 1	605	585	-	503	502	-	-	-	-	-	-	-
Stage 2	487	501	-	544	582	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	167	220	632	122	219	620	1132	-	-	1122	-	-
Mov Cap-2 Maneuver	167	220	-	122	219	-	-	-	-	-	-	-
Stage 1	555	583	-	462	461	-	-	-	-	-	-	-
Stage 2	401	460	-	401	580	-	-	-	-	-	-	-

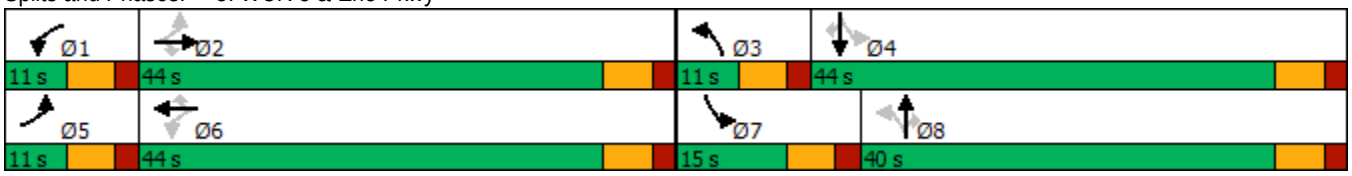
Approach	EB	WB	NB	SB
HCM Control Delay, s	26.6	29.5	1.2	0.1
HCM LOS	D	D		

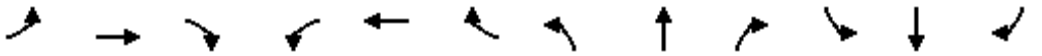
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1132	-	-	355	206	1122	-	-
HCM Lane V/C Ratio	0.062	-	-	0.544	0.292	0.003	-	-
HCM Control Delay (s)	8.4	0	-	26.6	29.5	8.2	0	-
HCM Lane LOS	A	A	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	3.1	1.2	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	238	1121	368	29	661	395	294	357	74	364	286	182
Future Volume (vph)	238	1121	368	29	661	395	294	357	74	364	286	182
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	25.0	25.0	5.0	25.0	25.0	5.0	8.0	8.0	5.0	8.0	8.0
Minimum Split (s)	11.0	36.0	36.0	11.0	36.0	36.0	11.0	40.0	40.0	11.0	40.0	40.0
Total Split (s)	11.0	44.0	44.0	11.0	44.0	44.0	11.0	40.0	40.0	15.0	44.0	44.0
Total Split (%)	10.0%	40.0%	40.0%	10.0%	40.0%	40.0%	10.0%	36.4%	36.4%	13.6%	40.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	45.5	42.6	42.6	43.0	38.0	38.0	19.2	14.2	14.2	27.2	18.2	18.2
Actuated g/C Ratio	0.50	0.47	0.47	0.48	0.42	0.42	0.21	0.16	0.16	0.30	0.20	0.20
v/c Ratio	1.42	1.40	0.48	0.18	0.93	0.52	1.23	0.70	0.22	1.41	0.44	0.43
Control Delay	240.5	212.7	12.3	13.1	45.3	9.2	162.4	43.3	1.6	229.0	33.4	9.2
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	240.5	212.7	12.3	13.1	45.3	9.2	162.4	43.3	1.6	229.0	33.4	9.2
LOS	F	F	B	B	D	A	F	D	A	F	C	A
Approach Delay		173.9			31.3			87.4			113.7	
Approach LOS		F			C			F			F	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 90.3	
Natural Cycle: 150	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.42	
Intersection Signal Delay: 112.6	Intersection LOS: F
Intersection Capacity Utilization 113.2%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 5: WCR 5 & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	238	1121	368	29	661	395	294	357	74	364	286	182
Future Volume (veh/h)	238	1121	368	29	661	395	294	357	74	364	286	182
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	262	1232	404	32	726	434	323	392	81	400	314	200
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	212	846	717	136	799	677	281	519	231	298	678	303
Arrive On Green	0.06	0.45	0.45	0.03	0.43	0.43	0.06	0.15	0.15	0.10	0.19	0.19
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	262	1232	404	32	726	434	323	392	81	400	314	200
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.0	40.3	16.7	0.9	32.3	19.2	5.0	9.4	4.1	9.0	7.0	10.4
Cycle Q Clear(g_c), s	5.0	40.3	16.7	0.9	32.3	19.2	5.0	9.4	4.1	9.0	7.0	10.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	212	846	717	136	799	677	281	519	231	298	678	303
V/C Ratio(X)	1.24	1.46	0.56	0.24	0.91	0.64	1.15	0.76	0.35	1.34	0.46	0.66
Avail Cap(c_a), veh/h	212	846	717	181	799	677	281	1358	606	298	1517	677
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.9	24.4	17.9	21.4	23.9	20.1	37.2	36.5	34.2	33.7	32.0	33.3
Incr Delay (d2), s/veh	140.5	211.6	3.2	0.3	16.1	4.6	100.7	0.9	0.3	175.0	0.2	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.4	64.8	6.0	0.3	15.9	7.2	11.3	3.9	1.5	16.3	2.8	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	165.4	236.0	21.1	21.8	40.0	24.7	137.9	37.3	34.5	208.7	32.1	34.3
LnGrp LOS	F	F	C	C	D	C	F	D	C	F	C	C
Approach Vol, veh/h		1898			1192			796			914	
Approach Delay, s/veh		180.5			34.0			77.9			109.9	
Approach LOS		F			C			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	46.3	11.0	23.0	11.0	44.0	15.0	19.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	38.0	5.0	38.0	5.0	38.0	9.0	34.0
Max Q Clear Time (g_c+I1), s	2.9	42.3	7.0	12.4	7.0	34.3	11.0	11.4
Green Ext Time (p_c), s	0.0	0.0	0.0	1.5	0.0	2.5	0.0	1.6

Intersection Summary		
HCM 6th Ctrl Delay		113.6
HCM 6th LOS		F

Intersection	
Int Delay, s/veh	2.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1484	75	89	1085	0	80
Future Vol, veh/h	1484	75	89	1085	0	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	110	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1579	80	95	1154	0	85

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1659	0	-	1579
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.12	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.218	-	-	3.318
Pot Cap-1 Maneuver	-	-	388	-	0	135
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	388	-	-	135
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	68.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	135	-	-	388	-
HCM Lane V/C Ratio	0.63	-	-	0.244	-
HCM Control Delay (s)	68.8	-	-	17.2	-
HCM Lane LOS	F	-	-	C	-
HCM 95th %tile Q(veh)	3.3	-	-	0.9	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1412	152	100	1058	116	101
Future Volume (vph)	1412	152	100	1058	116	101
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	15.0	15.0	5.0	15.0	10.0	10.0
Minimum Split (s)	20.0	20.0	10.0	20.0	20.0	20.0
Total Split (s)	80.0	80.0	10.0	90.0	20.0	20.0
Total Split (%)	72.7%	72.7%	9.1%	81.8%	18.2%	18.2%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Max	Max	Max	None	None	None
Act Effct Green (s)	75.0	75.0	85.0	85.0	12.6	12.6
Actuated g/C Ratio	0.70	0.70	0.79	0.79	0.12	0.12
v/c Ratio	1.14	0.14	0.70	0.76	0.59	0.38
Control Delay	93.9	2.7	39.8	10.5	57.2	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	93.9	2.7	39.8	10.5	57.2	12.6
LOS	F	A	D	B	E	B
Approach Delay	85.0			13.1	36.5	
Approach LOS	F			B	D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 107.6	
Natural Cycle: 150	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.14	
Intersection Signal Delay: 53.1	Intersection LOS: D
Intersection Capacity Utilization 99.8%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 7: Waterford St & Erie Pkwy

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1412	152	100	1058	116	101
Future Volume (veh/h)	1412	152	100	1058	116	101
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1486	160	105	1114	122	106
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1336	1132	153	1514	169	151
Arrive On Green	0.71	0.71	0.05	0.81	0.10	0.10
Sat Flow, veh/h	1870	1585	1781	1870	1781	1585
Grp Volume(v), veh/h	1486	160	105	1114	122	106
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1781	1585
Q Serve(g_s), s	75.0	3.4	2.0	29.4	7.0	6.8
Cycle Q Clear(g_c), s	75.0	3.4	2.0	29.4	7.0	6.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1336	1132	153	1514	169	151
V/C Ratio(X)	1.11	0.14	0.68	0.74	0.72	0.70
Avail Cap(c_a), veh/h	1336	1132	153	1514	255	226
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.0	4.8	32.9	4.7	46.1	46.1
Incr Delay (d2), s/veh	61.4	0.3	22.0	1.9	5.6	5.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	44.1	0.9	2.8	5.7	3.3	2.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	76.4	5.0	54.9	6.6	51.8	51.9
LnGrp LOS	F	A	D	A	D	D
Approach Vol, veh/h	1646			1219	228	
Approach Delay, s/veh	69.5			10.8	51.8	
Approach LOS	E			B	D	

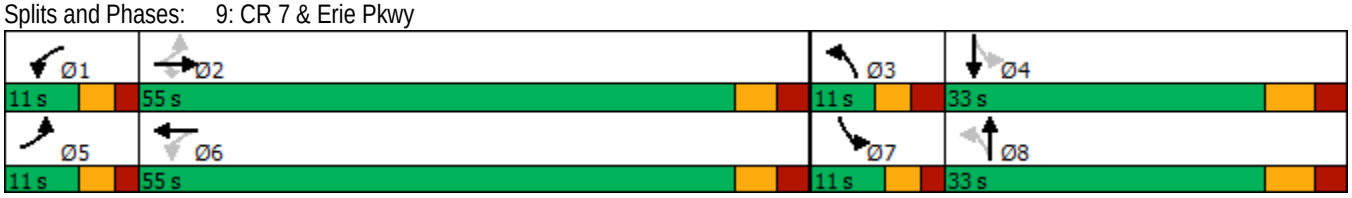
Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	10.0	80.0				90.0	15.0
Change Period (Y+Rc), s	5.0	5.0				5.0	5.0
Max Green Setting (Gmax), s	5.0	75.0				85.0	15.0
Max Q Clear Time (g_c+I1), s	4.0	77.0				31.4	9.0
Green Ext Time (p_c), s	0.0	0.0				11.8	0.3

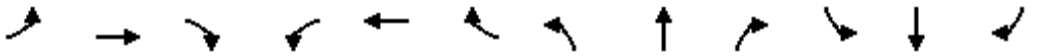
Intersection Summary	
HCM 6th Ctrl Delay	45.1
HCM 6th LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	70	1354	89	108	998	96	278	254	166
Future Volume (vph)	70	1354	89	108	998	96	278	254	166
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6	3	8	7	4
Permitted Phases	2		2	6		8		4	
Detector Phase	5	2	2	1	6	3	8	7	4
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	10.0	32.3	32.3	10.0	32.3	10.8	32.8	10.0	32.8
Total Split (s)	11.0	55.0	55.0	11.0	55.0	11.0	33.0	11.0	33.0
Total Split (%)	10.0%	50.0%	50.0%	10.0%	50.0%	10.0%	30.0%	10.0%	30.0%
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	2.8	2.0	2.8
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	6.3	6.3	5.0	6.3	5.8	6.8	5.0	6.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	None	None	None	None
Act Effct Green (s)	56.0	48.7	48.7	57.1	51.1	30.5	24.3	32.1	24.3
Actuated g/C Ratio	0.52	0.45	0.45	0.53	0.47	0.28	0.22	0.30	0.22
v/c Ratio	0.45	1.74	0.12	0.70	1.36	0.37	0.89	1.44	0.60
Control Delay	21.1	360.8	1.1	39.8	196.3	30.3	64.4	255.3	41.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.1	360.8	1.1	39.8	196.3	30.3	64.4	255.3	41.4
LOS	C	F	A	D	F	C	E	F	D
Approach Delay		323.9			182.3		57.0		153.7
Approach LOS		F			F		E		F

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 108.2	
Natural Cycle: 150	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.74	
Intersection Signal Delay: 222.2	Intersection LOS: F
Intersection Capacity Utilization 129.2%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 9: CR 7 & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	1354	89	108	998	101	96	278	66	254	166	64
Future Volume (veh/h)	70	1354	89	108	998	101	96	278	66	254	166	64
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	75	1456	96	116	1073	109	103	299	71	273	178	69
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	141	849	719	159	774	79	265	327	78	191	287	111
Arrive On Green	0.04	0.45	0.45	0.05	0.46	0.46	0.05	0.22	0.22	0.06	0.22	0.22
Sat Flow, veh/h	1781	1870	1585	1781	1670	170	1781	1461	347	1781	1283	497
Grp Volume(v), veh/h	75	1456	96	116	0	1182	103	0	370	273	0	247
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1840	1781	0	1808	1781	0	1781
Q Serve(g_s), s	2.4	48.7	3.8	3.7	0.0	49.8	4.8	0.0	21.4	6.0	0.0	13.4
Cycle Q Clear(g_c), s	2.4	48.7	3.8	3.7	0.0	49.8	4.8	0.0	21.4	6.0	0.0	13.4
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.19	1.00		0.28
Lane Grp Cap(c), veh/h	141	849	719	159	0	853	265	0	404	191	0	398
V/C Ratio(X)	0.53	1.72	0.13	0.73	0.00	1.39	0.39	0.00	0.92	1.43	0.00	0.62
Avail Cap(c_a), veh/h	167	849	719	167	0	853	265	0	441	191	0	435
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.3	29.3	17.0	25.1	0.0	28.8	31.1	0.0	40.7	39.4	0.0	37.6
Incr Delay (d2), s/veh	3.1	326.9	0.4	14.4	0.0	180.7	0.9	0.0	22.6	221.7	0.0	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	96.5	1.4	2.0	0.0	62.2	2.1	0.0	11.6	13.8	0.0	5.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.4	356.2	17.4	39.5	0.0	209.5	32.0	0.0	63.3	261.1	0.0	39.9
LnGrp LOS	C	F	B	D	A	F	C	A	E	F	A	D
Approach Vol, veh/h		1627			1298			473			520	
Approach Delay, s/veh		321.1			194.3			56.5			156.1	
Approach LOS		F			F			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.5	55.0	11.0	30.8	9.5	56.1	11.0	30.8
Change Period (Y+Rc), s	5.0	* 6.3	* 5.8	* 6.8	5.0	* 6.3	5.0	* 6.8
Max Green Setting (Gmax), s	6.0	* 49	* 5.2	* 26	6.0	* 49	6.0	* 26
Max Q Clear Time (g_c+I1), s	5.7	50.7	6.8	15.4	4.4	51.8	8.0	23.4
Green Ext Time (p_c), s	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.5

Intersection Summary	
HCM 6th Ctrl Delay	225.2
HCM 6th LOS	F

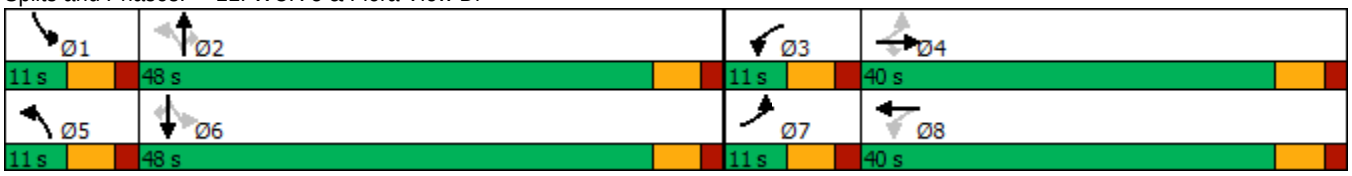
Notes

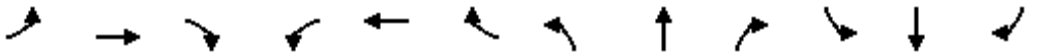
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	13	15	106	32	10	140	432	40	20	520	20
Future Volume (vph)	13	15	106	32	10	140	432	40	20	520	20
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	10.0	10.0	5.0	10.0	5.0	25.0	25.0	5.0	25.0	25.0
Minimum Split (s)	11.0	40.0	40.0	11.0	40.0	11.0	36.0	36.0	11.0	36.0	36.0
Total Split (s)	11.0	40.0	40.0	11.0	40.0	11.0	48.0	48.0	11.0	48.0	48.0
Total Split (%)	10.0%	36.4%	36.4%	10.0%	36.4%	10.0%	43.6%	43.6%	10.0%	43.6%	43.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	12.9	10.0	10.0	15.2	14.2	51.5	49.6	49.6	47.8	42.8	42.8
Actuated g/C Ratio	0.16	0.12	0.12	0.18	0.17	0.63	0.60	0.60	0.58	0.52	0.52
v/c Ratio	0.07	0.08	0.40	0.15	0.11	0.47	0.47	0.05	0.05	0.65	0.03
Control Delay	25.8	34.8	8.8	27.2	18.5	11.5	13.2	0.1	6.8	19.5	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	25.8	34.8	8.8	27.2	18.5	11.5	13.2	0.1	6.8	19.5	0.1
LOS	C	C	A	C	B	B	B	A	A	B	A
Approach Delay		13.3			23.2		12.0			18.4	
Approach LOS		B			C		B			B	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 82.2	
Natural Cycle: 100	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 15.2	Intersection LOS: B
Intersection Capacity Utilization 58.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 11: WCR 5 & Flora View Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	15	106	32	10	17	140	432	40	20	520	20
Future Volume (veh/h)	13	15	106	32	10	17	140	432	40	20	520	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	18	129	39	12	21	171	527	49	24	634	24
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	281	221	187	285	82	144	382	1000	848	426	937	794
Arrive On Green	0.02	0.12	0.12	0.04	0.14	0.14	0.06	0.53	0.53	0.03	0.50	0.50
Sat Flow, veh/h	1781	1870	1585	1781	610	1068	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	16	18	129	39	0	33	171	527	49	24	634	24
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1678	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.7	0.7	6.6	1.6	0.0	1.5	3.9	15.3	1.2	0.5	21.5	0.6
Cycle Q Clear(g_c), s	0.7	0.7	6.6	1.6	0.0	1.5	3.9	15.3	1.2	0.5	21.5	0.6
Prop In Lane	1.00		1.00	1.00		0.64	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	281	221	187	285	0	227	382	1000	848	426	937	794
V/C Ratio(X)	0.06	0.08	0.69	0.14	0.00	0.15	0.45	0.53	0.06	0.06	0.68	0.03
Avail Cap(c_a), veh/h	354	758	642	328	0	680	382	1000	848	487	937	794
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.6	32.9	35.5	30.7	0.0	32.0	12.5	12.6	9.4	10.5	15.8	10.6
Incr Delay (d2), s/veh	0.1	0.2	4.5	0.2	0.0	0.3	0.8	2.0	0.1	0.1	3.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.3	2.7	0.7	0.0	0.6	1.3	5.9	0.4	0.2	8.8	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.6	33.1	40.0	30.9	0.0	32.3	13.3	14.6	9.5	10.5	19.7	10.7
LnGrp LOS	C	C	D	C	A	C	B	B	A	B	B	B
Approach Vol, veh/h		163			72			747			682	
Approach Delay, s/veh		38.4			31.6			14.0			19.1	
Approach LOS		D			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.1	50.9	9.0	15.9	11.0	48.0	7.6	17.3
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	42.0	5.0	34.0	5.0	42.0	5.0	34.0
Max Q Clear Time (g_c+I1), s	2.5	17.3	3.6	8.6	5.9	23.5	2.7	3.5
Green Ext Time (p_c), s	0.0	3.3	0.0	0.5	0.0	3.8	0.0	0.1

Intersection Summary		
HCM 6th Ctrl Delay		19.2
HCM 6th LOS		B

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1	2	447	483	1
Future Vol, veh/h	0	1	2	447	483	1
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	2	461	498	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	964	499	499	0	-	0
Stage 1	499	-	-	-	-	-
Stage 2	465	-	-	-	-	-
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	283	572	1065	-	-	-
Stage 1	610	-	-	-	-	-
Stage 2	632	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	282	572	1065	-	-	-
Mov Cap-2 Maneuver	282	-	-	-	-	-
Stage 1	608	-	-	-	-	-
Stage 2	632	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1065	-	572	-	-
HCM Lane V/C Ratio	0.002	-	0.002	-	-
HCM Control Delay (s)	8.4	0	11.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	48	20	592	42	13	645
Future Vol, veh/h	48	20	592	42	13	645
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	-	-	0	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	22	651	46	14	709

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1034	326	0	0	697	0
Stage 1	651	-	-	-	-	-
Stage 2	383	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	228	670	-	-	895	-
Stage 1	481	-	-	-	-	-
Stage 2	659	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	224	670	-	-	895	-
Mov Cap-2 Maneuver	224	-	-	-	-	-
Stage 1	481	-	-	-	-	-
Stage 2	648	-	-	-	-	-

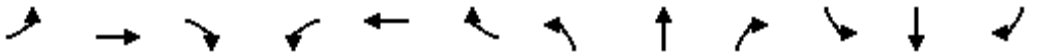
Approach	WB	NB	SB
HCM Control Delay, s	22.6	0	0.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	279	895	-
HCM Lane V/C Ratio	-	-	0.268	0.016	-
HCM Control Delay (s)	-	-	22.6	9.1	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	1.1	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	37	5	108	55	13	177	570	21	42	610	41
Future Volume (vph)	37	5	108	55	13	177	570	21	42	610	41
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	20.0	20.0	10.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0
Total Split (s)	12.0	30.0	30.0	12.0	30.0	12.0	66.0	66.0	12.0	66.0	66.0
Total Split (%)	10.0%	25.0%	25.0%	10.0%	25.0%	10.0%	55.0%	55.0%	10.0%	55.0%	55.0%
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)	12.4	7.1	7.1	13.6	9.5	70.6	66.5	66.5	67.4	61.2	61.2
Actuated g/C Ratio	0.12	0.07	0.07	0.14	0.10	0.71	0.67	0.67	0.68	0.61	0.61
v/c Ratio	0.20	0.04	0.53	0.30	0.23	0.35	0.26	0.02	0.08	0.31	0.04
Control Delay	37.0	44.2	17.8	38.9	25.4	6.7	8.7	0.0	5.1	10.3	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	37.0	44.2	17.8	38.9	25.4	6.7	8.7	0.0	5.1	10.3	0.1
LOS	D	D	B	D	C	A	A	A	A	B	A
Approach Delay		23.3			33.3		8.0			9.4	
Approach LOS		C			C		A			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 99.7	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 11.3	Intersection LOS: B
Intersection Capacity Utilization 48.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 21: WCR 5 & Colliers Pkwy/Erie HS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	5	108	55	13	27	177	570	21	42	610	41
Future Volume (veh/h)	37	5	108	55	13	27	177	570	21	42	610	41
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	40	5	117	60	14	29	192	620	23	46	663	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	238	177	150	274	55	115	577	2239	999	579	2152	960
Arrive On Green	0.03	0.09	0.09	0.04	0.10	0.10	0.06	0.63	0.63	0.04	0.61	0.61
Sat Flow, veh/h	1781	1870	1585	1781	543	1125	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	40	5	117	60	0	43	192	620	23	46	663	45
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1668	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	2.0	0.2	7.3	3.0	0.0	2.4	4.1	7.9	0.5	1.0	9.1	1.2
Cycle Q Clear(g_c), s	2.0	0.2	7.3	3.0	0.0	2.4	4.1	7.9	0.5	1.0	9.1	1.2
Prop In Lane	1.00		1.00	1.00		0.67	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	238	177	150	274	0	170	577	2239	999	579	2152	960
V/C Ratio(X)	0.17	0.03	0.78	0.22	0.00	0.25	0.33	0.28	0.02	0.08	0.31	0.05
Avail Cap(c_a), veh/h	302	464	393	325	0	414	593	2239	999	639	2152	960
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.2	41.4	44.6	39.0	0.0	41.7	6.8	8.3	7.0	6.8	9.6	8.1
Incr Delay (d2), s/veh	0.3	0.1	8.5	0.4	0.0	0.8	0.3	0.3	0.0	0.1	0.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.1	3.2	1.4	0.0	1.0	1.3	2.6	0.2	0.3	3.1	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.5	41.5	53.0	39.4	0.0	42.5	7.2	8.7	7.0	6.9	10.0	8.2
LnGrp LOS	D	D	D	D	A	D	A	A	A	A	B	A
Approach Vol, veh/h		162			103			835			754	
Approach Delay, s/veh		49.3			40.7			8.3			9.7	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	68.5	9.1	14.5	11.1	66.0	8.4	15.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	61.0	7.0	25.0	7.0	61.0	7.0	25.0
Max Q Clear Time (g_c+I1), s	3.0	9.9	5.0	9.3	6.1	11.1	4.0	4.4
Green Ext Time (p_c), s	0.0	4.4	0.0	0.3	0.0	4.8	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	14.2
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	29	14	0	3	0	795	195	18	789	10
Future Vol, veh/h	0	0	29	14	0	3	0	795	195	18	789	10
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	-	-	0	-	-	-	-	-	250	125	-	120
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	0	0	34	16	0	3	0	924	227	21	917	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	459	1425	1895	462	-	0	0	1151	0	0
Stage 1	-	-	-	924	924	-	-	-	-	-	-	-
Stage 2	-	-	-	501	971	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	7.54	6.54	6.94	-	-	-	4.14	-	-
Critical Hdwy Stg 1	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	3.52	4.02	3.32	-	-	-	2.22	-	-
Pot Cap-1 Maneuver	0	0	549	96	69	547	0	-	-	603	-	-
Stage 1	0	0	-	290	346	-	0	-	-	-	-	-
Stage 2	0	0	-	521	329	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	549	88	67	547	-	-	-	603	-	-
Mov Cap-2 Maneuver	-	-	-	88	67	-	-	-	-	-	-	-
Stage 1	-	-	-	290	346	-	-	-	-	-	-	-
Stage 2	-	-	-	472	317	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12	48.1	0	0.2
HCM LOS	B	E		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	549	103	603	-	-
HCM Lane V/C Ratio	-	-	0.061	0.192	0.035	-	-
HCM Control Delay (s)	-	-	12	48.1	11.2	-	-
HCM Lane LOS	-	-	B	E	B	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0.7	0.1	-	-

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	325	198	582	404
Demand Flow Rate, veh/h	331	202	594	411
Vehicles Circulating, veh/h	440	580	137	308
Vehicles Exiting, veh/h	279	151	634	474
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.5	7.8	8.5	8.2
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	331	202	594	411
Cap Entry Lane, veh/h	881	764	1200	1008
Entry HV Adj Factor	0.982	0.981	0.980	0.982
Flow Entry, veh/h	325	198	582	404
Cap Entry, veh/h	865	749	1177	990
V/C Ratio	0.376	0.264	0.495	0.408
Control Delay, s/veh	8.5	7.8	8.5	8.2
LOS	A	A	A	A
95th %tile Queue, veh	2	1	3	2

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	136	3	6	187	0	18
Future Vol, veh/h	136	3	6	187	0	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	220	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	145	3	6	199	0	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	148	0	-	147
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.12	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.218	-	-	3.318
Pot Cap-1 Maneuver	-	-	1434	-	0	900
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1434	-	-	900
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	900	-	-	1434	-
HCM Lane V/C Ratio	0.021	-	-	0.004	-
HCM Control Delay (s)	9.1	-	-	7.5	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	137	16	9	165	28	26
Future Vol, veh/h	137	16	9	165	28	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	220	220	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	146	17	10	176	30	28

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	163	0	342	146
Stage 1	-	-	-	-	146	-
Stage 2	-	-	-	-	196	-
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	-	-	1416	-	654	901
Stage 1	-	-	-	-	881	-
Stage 2	-	-	-	-	837	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1416	-	649	901
Mov Cap-2 Maneuver	-	-	-	-	649	-
Stage 1	-	-	-	-	881	-
Stage 2	-	-	-	-	831	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	10
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	649	901	-	-	1416	-
HCM Lane V/C Ratio	0.046	0.031	-	-	0.007	-
HCM Control Delay (s)	10.8	9.1	-	-	7.6	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	45	77	15	65	4	71	228	13	3	357	26
Future Vol, veh/h	38	45	77	15	65	4	71	228	13	3	357	26
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	220	-	-	220	-	-	-	-	220	-	-	220
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	40	48	82	16	69	4	76	243	14	3	380	28

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	825	795	380	860	809	243	408	0	0	257	0	0
Stage 1	386	386	-	395	395	-	-	-	-	-	-	-
Stage 2	439	409	-	465	414	-	-	-	-	-	-	-
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	320	667	276	314	796	1151	-	-	1308	-	-
Stage 1	637	610	-	630	605	-	-	-	-	-	-	-
Stage 2	597	596	-	578	593	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	223	294	667	199	289	796	1151	-	-	1308	-	-
Mov Cap-2 Maneuver	223	294	-	199	289	-	-	-	-	-	-	-
Stage 1	588	608	-	581	558	-	-	-	-	-	-	-
Stage 2	480	550	-	466	591	-	-	-	-	-	-	-

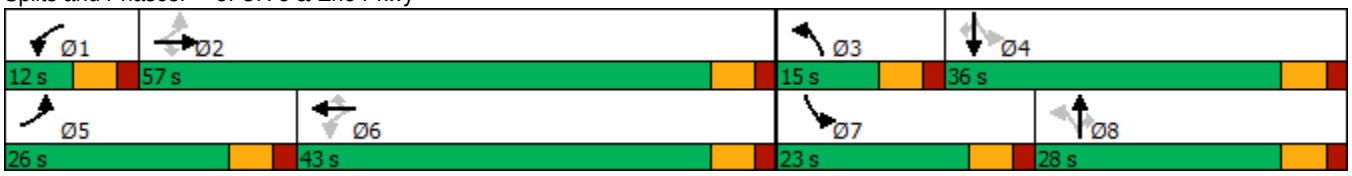
Approach	EB	WB	NB	SB
HCM Control Delay, s	18.1	21.5	1.9	0.1
HCM LOS	C	C		

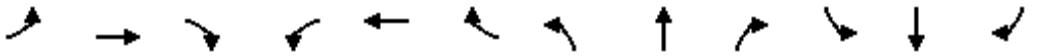
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1151	-	-	223	454	199	300	1308	-	-
HCM Lane V/C Ratio	0.066	-	-	0.181	0.286	0.08	0.245	0.002	-	-
HCM Control Delay (s)	8.3	0	-	24.7	16.1	24.7	20.8	7.8	0	-
HCM Lane LOS	A	A	-	C	C	C	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.6	1.2	0.3	0.9	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	315	800	214	134	1005	322	266	321	64	339	321	340
Future Volume (vph)	315	800	214	134	1005	322	266	321	64	339	321	340
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	25.0	25.0	5.0	25.0	25.0	5.0	8.0	8.0	5.0	8.0	8.0
Minimum Split (s)	11.0	31.0	31.0	11.0	31.0	31.0	11.0	14.0	14.0	11.0	14.0	14.0
Total Split (s)	26.0	57.0	57.0	12.0	43.0	43.0	15.0	28.0	28.0	23.0	36.0	36.0
Total Split (%)	21.7%	47.5%	47.5%	10.0%	35.8%	35.8%	12.5%	23.3%	23.3%	19.2%	30.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	63.1	51.1	51.1	43.9	38.9	37.9	24.2	15.2	15.2	38.2	23.2	23.2
Actuated g/C Ratio	0.56	0.45	0.45	0.39	0.34	0.33	0.21	0.13	0.13	0.34	0.20	0.20
v/c Ratio	0.92	0.53	0.27	0.49	0.88	0.46	1.02	0.72	0.16	1.01	0.47	0.66
Control Delay	61.1	24.4	3.5	22.4	45.5	5.7	96.2	56.0	0.8	83.2	41.8	16.2
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	61.1	24.4	3.5	22.4	45.5	5.7	96.2	56.0	0.8	83.2	41.8	16.2
LOS	E	C	A	C	D	A	F	E	A	F	D	B
Approach Delay		29.7			34.6			67.0			47.1	
Approach LOS		C			C			E			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 113.3	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 40.7	Intersection LOS: D
Intersection Capacity Utilization 92.1%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 5: CR 5 & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	315	800	214	134	1005	322	266	321	64	339	321	340
Future Volume (veh/h)	315	800	214	134	1005	322	266	321	64	339	321	340
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	335	851	228	143	1069	343	283	341	68	361	341	362
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	360	1523	679	280	1154	501	317	628	280	402	867	386
Arrive On Green	0.16	0.43	0.43	0.05	0.32	0.32	0.08	0.18	0.18	0.14	0.24	0.24
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	335	851	228	143	1069	343	283	341	68	361	341	362
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	17.3	21.4	11.4	6.0	34.6	22.5	9.0	10.4	4.4	17.0	9.6	26.6
Cycle Q Clear(g_c), s	17.3	21.4	11.4	6.0	34.6	22.5	9.0	10.4	4.4	17.0	9.6	26.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	360	1523	679	280	1154	501	317	628	280	402	867	386
V/C Ratio(X)	0.93	0.56	0.34	0.51	0.93	0.68	0.89	0.54	0.24	0.90	0.39	0.94
Avail Cap(c_a), veh/h	370	1523	679	280	1154	501	317	657	293	402	896	400
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.5	25.6	22.7	27.0	38.8	35.5	43.2	44.6	42.2	36.0	37.6	44.1
Incr Delay (d2), s/veh	28.9	1.5	1.3	0.7	13.8	7.4	25.1	0.4	0.2	21.7	0.1	28.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.2	8.8	4.5	2.7	16.4	9.6	6.2	4.6	1.7	4.6	4.1	13.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.4	27.0	24.0	27.7	52.6	42.9	68.2	45.0	42.3	57.7	37.7	72.6
LnGrp LOS	E	C	C	C	D	D	E	D	D	E	D	E
Approach Vol, veh/h		1414			1555			692			1064	
Approach Delay, s/veh		35.2			48.2			54.2			56.4	
Approach LOS		D			D			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	57.0	15.0	35.0	25.3	43.7	23.0	27.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	51.0	9.0	30.0	20.0	37.0	17.0	22.0
Max Q Clear Time (g_c+I1), s	8.0	23.4	11.0	28.6	19.3	36.6	19.0	12.4
Green Ext Time (p_c), s	0.0	9.7	0.0	0.4	0.0	0.4	0.0	1.1

Intersection Summary	
HCM 6th Ctrl Delay	47.0
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱	↰	↑↑	↱			↱			↱
Traffic Vol, veh/h	0	1179	23	45	1392	5	1	0	102	0	0	69
Future Vol, veh/h	0	1179	23	45	1392	5	1	0	102	0	0	69
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	-	-	220	110	-	220	-	-	0	-	-	0
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	0	1254	24	48	1481	5	1	0	109	0	0	73

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	1278	0	0	2091	-	627	-	-	741
Stage 1	-	-	-	-	-	-	1254	-	-	-	-	-
Stage 2	-	-	-	-	-	-	837	-	-	-	-	-
Critical Hdwy	-	-	-	4.14	-	-	7.54	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	-	-	-	-	-
Follow-up Hdwy	-	-	-	2.22	-	-	3.52	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	539	-	-	30	0	426	0	0	359
Stage 1	0	-	-	-	-	-	182	0	-	0	0	-
Stage 2	0	-	-	-	-	-	327	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	539	-	-	22	-	426	-	-	359
Mov Cap-2 Maneuver	-	-	-	-	-	-	22	-	-	-	-	-
Stage 1	-	-	-	-	-	-	182	-	-	-	-	-
Stage 2	-	-	-	-	-	-	237	-	-	-	-	-

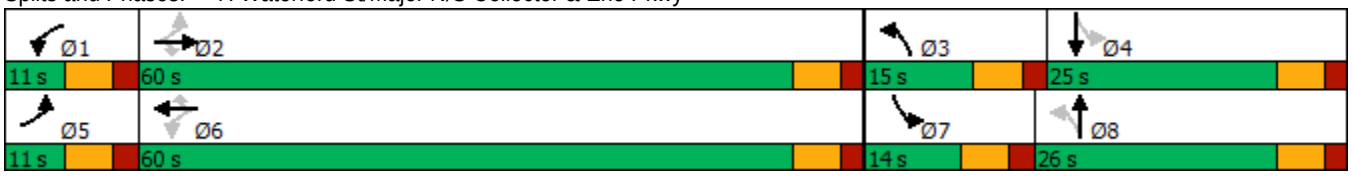
Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.4	16.3	17.6
HCM LOS			C	C

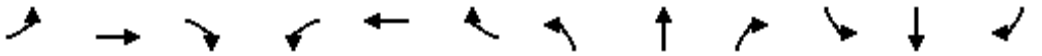
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	426	-	-	539	-	-	359
HCM Lane V/C Ratio	0.255	-	-	0.089	-	-	0.204
HCM Control Delay (s)	16.3	-	-	12.3	-	-	17.6
HCM Lane LOS	C	-	-	B	-	-	C
HCM 95th %tile Q(veh)	1	-	-	0.3	-	-	0.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	50	1083	148	28	1126	51	226	0	172	0
Future Volume (vph)	50	1083	148	28	1126	51	226	0	172	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6		3	8	7	4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	7	4
Switch Phase										
Minimum Initial (s)	5.0	25.0	25.0	5.0	25.0	25.0	5.0	8.0	5.0	8.0
Minimum Split (s)	11.0	31.0	31.0	11.0	31.0	31.0	11.0	20.0	11.0	20.0
Total Split (s)	11.0	60.0	60.0	11.0	60.0	60.0	15.0	26.0	14.0	25.0
Total Split (%)	9.9%	54.1%	54.1%	9.9%	54.1%	54.1%	13.5%	23.4%	12.6%	22.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	Max	None	Max
Act Effct Green (s)	59.2	56.3	56.3	58.0	54.1	54.1	29.1	20.0	27.0	19.0
Actuated g/C Ratio	0.54	0.52	0.52	0.53	0.50	0.50	0.27	0.18	0.25	0.17
v/c Ratio	0.26	0.63	0.18	0.14	0.68	0.06	0.65	0.46	0.62	0.24
Control Delay	13.3	21.5	3.0	11.3	23.8	0.1	41.4	15.2	41.4	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.3	21.5	3.0	11.3	23.8	0.1	41.4	15.2	41.4	3.1
LOS	B	C	A	B	C	A	D	B	D	A
Approach Delay		19.1			22.5			29.8		28.3
Approach LOS		B			C			C		C

Intersection Summary	
Cycle Length: 111	
Actuated Cycle Length: 108.8	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 22.5	Intersection LOS: C
Intersection Capacity Utilization 75.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 7: Waterford St/Major N/S Collector & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	1083	148	28	1126	51	226	0	179	172	0	90
Future Volume (veh/h)	50	1083	148	28	1126	51	226	0	179	172	0	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	53	1152	157	30	1198	54	240	0	190	183	0	96
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	239	1777	793	223	1744	778	366	0	288	279	0	274
Arrive On Green	0.04	0.50	0.50	0.03	0.49	0.49	0.08	0.00	0.18	0.07	0.00	0.17
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	0	1585	1781	0	1585
Grp Volume(v), veh/h	53	1152	157	30	1198	54	240	0	190	183	0	96
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	0	1585	1781	0	1585
Q Serve(g_s), s	1.6	26.4	6.0	0.9	28.5	2.0	9.0	0.0	12.3	8.0	0.0	5.9
Cycle Q Clear(g_c), s	1.6	26.4	6.0	0.9	28.5	2.0	9.0	0.0	12.3	8.0	0.0	5.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	239	1777	793	223	1744	778	366	0	288	279	0	274
V/C Ratio(X)	0.22	0.65	0.20	0.13	0.69	0.07	0.66	0.00	0.66	0.66	0.00	0.35
Avail Cap(c_a), veh/h	255	1777	793	256	1744	778	366	0	288	279	0	274
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.8	20.3	15.3	16.1	21.5	14.8	37.3	0.0	41.8	37.2	0.0	40.1
Incr Delay (d2), s/veh	0.5	1.8	0.6	0.3	2.2	0.2	4.2	0.0	11.3	5.5	0.0	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	10.3	2.3	0.3	11.2	0.7	2.0	0.0	5.7	1.3	0.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.3	22.2	15.8	16.4	23.7	14.9	41.5	0.0	53.1	42.7	0.0	43.6
LnGrp LOS	B	C	B	B	C	B	D	A	D	D	A	D
Approach Vol, veh/h		1362			1282			430			279	
Approach Delay, s/veh		21.3			23.2			46.6			43.0	
Approach LOS		C			C			D			D	

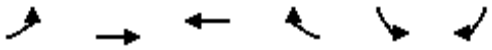
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	61.0	15.0	25.0	10.0	60.0	14.0	26.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	54.0	9.0	19.0	5.0	54.0	8.0	20.0
Max Q Clear Time (g_c+I1), s	2.9	28.4	11.0	7.9	3.6	30.5	10.0	14.3
Green Ext Time (p_c), s	0.0	8.9	0.0	0.3	0.0	8.6	0.0	0.5

Intersection Summary	
HCM 6th Ctrl Delay	27.1
HCM 6th LOS	C

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	82	1352	1111	82	78	94
Future Volume (vph)	82	1352	1111	82	78	94
Turn Type	pm+pt	NA	NA	Perm	Prot	Prot
Protected Phases	5	2	6		4	4
Permitted Phases	2			6		
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	20.0	20.0	20.0	10.0	10.0
Total Split (s)	12.0	85.0	73.0	73.0	25.0	25.0
Total Split (%)	10.9%	77.3%	66.4%	66.4%	22.7%	22.7%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	Min	Min	Min	None	None
Act Effct Green (s)	41.5	43.0	34.1	34.1	8.5	8.5
Actuated g/C Ratio	0.72	0.75	0.60	0.60	0.15	0.15
v/c Ratio	0.23	0.54	0.56	0.09	0.32	0.31
Control Delay	4.7	5.4	11.8	2.5	28.4	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.7	5.4	11.8	2.5	28.4	9.6
LOS	A	A	B	A	C	A
Approach Delay		5.4	11.2		18.1	
Approach LOS		A	B		B	

Intersection Summary			
Cycle Length: 110			
Actuated Cycle Length: 57.3			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 8.6		Intersection LOS: A	
Intersection Capacity Utilization 52.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 8: Erie Pkwy & Minor N/S Collector



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	82	1352	1111	82	78	94
Future Volume (veh/h)	82	1352	1111	82	78	94
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	87	1438	1182	87	83	100
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	396	2440	1808	806	182	162
Arrive On Green	0.07	0.69	0.51	0.51	0.10	0.10
Sat Flow, veh/h	1781	3647	3647	1585	1781	1585
Grp Volume(v), veh/h	87	1438	1182	87	83	100
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1781	1585
Q Serve(g_s), s	0.9	10.1	11.6	1.3	2.1	2.9
Cycle Q Clear(g_c), s	0.9	10.1	11.6	1.3	2.1	2.9
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	396	2440	1808	806	182	162
V/C Ratio(X)	0.22	0.59	0.65	0.11	0.46	0.62
Avail Cap(c_a), veh/h	531	6012	5111	2279	753	670
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.0	3.9	8.5	6.0	20.0	20.3
Incr Delay (d2), s/veh	0.3	0.2	0.4	0.1	1.8	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.5	2.5	0.3	0.9	2.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.2	4.1	9.0	6.1	21.8	24.2
LnGrp LOS	A	A	A	A	C	C
Approach Vol, veh/h		1525	1269		183	
Approach Delay, s/veh		4.3	8.8		23.1	
Approach LOS		A	A		C	

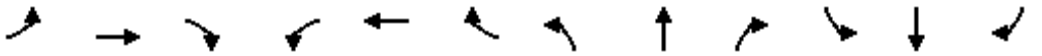
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		37.5		9.8	8.4	29.1
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		80.0		20.0	7.0	68.0
Max Q Clear Time (g_c+I1), s		12.1		4.9	2.9	13.6
Green Ext Time (p_c), s		14.4		0.4	0.1	10.5

Intersection Summary	
HCM 6th Ctrl Delay	7.3
HCM 6th LOS	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	1303	71	116	960	104	132	119	23	190	213	101
Future Volume (vph)	57	1303	71	116	960	104	132	119	23	190	213	101
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	20.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	10.0	26.3	26.3	10.0	26.3	26.3	10.8	21.8	21.8	10.0	21.8	21.8
Total Split (s)	12.0	61.0	61.0	12.0	61.0	61.0	12.0	25.0	25.0	12.0	25.0	25.0
Total Split (%)	10.9%	55.5%	55.5%	10.9%	55.5%	55.5%	10.9%	22.7%	22.7%	10.9%	22.7%	22.7%
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.5	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	2.8	2.8	2.8	2.0	2.8	2.8
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	6.3	6.3	5.0	6.3	6.3	5.8	6.8	6.8	5.0	6.8	6.8
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)	62.6	54.7	54.7	64.1	57.3	57.3	24.3	17.1	17.1	25.9	17.1	17.1
Actuated g/C Ratio	0.57	0.50	0.50	0.59	0.53	0.53	0.22	0.16	0.16	0.24	0.16	0.16
v/c Ratio	0.20	0.78	0.09	0.63	0.55	0.12	0.64	0.43	0.07	0.61	0.77	0.29
Control Delay	10.0	26.2	0.2	28.4	19.4	1.4	47.3	46.5	0.3	42.4	62.7	5.2
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	10.0	26.2	0.2	28.4	19.4	1.4	47.3	46.5	0.3	42.4	62.7	5.2
LOS	A	C	A	C	B	A	D	D	A	D	E	A
Approach Delay		24.2			18.7			43.1			43.6	
Approach LOS		C			B			D			D	

Intersection Summary		
Cycle Length: 110		
Actuated Cycle Length: 108.9		
Natural Cycle: 80		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.78		
Intersection Signal Delay: 26.7	Intersection LOS: C	
Intersection Capacity Utilization 84.7%	ICU Level of Service E	
Analysis Period (min) 15		

Splits and Phases: 9: CR 7 & Erie Pkwy



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	57	1303	71	116	960	104	132	119	23	190	213	101
Future Volume (veh/h)	57	1303	71	116	960	104	132	119	23	190	213	101
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	61	1386	76	123	1021	111	140	127	24	202	227	107
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	309	1851	825	235	1887	842	199	267	226	287	267	226
Arrive On Green	0.04	0.52	0.52	0.05	0.53	0.53	0.06	0.14	0.14	0.07	0.14	0.14
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	61	1386	76	123	1021	111	140	127	24	202	227	107
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	1.6	32.2	2.5	3.3	19.9	3.7	6.2	6.6	1.4	7.0	12.4	6.5
Cycle Q Clear(g_c), s	1.6	32.2	2.5	3.3	19.9	3.7	6.2	6.6	1.4	7.0	12.4	6.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	309	1851	825	235	1887	842	199	267	226	287	267	226
V/C Ratio(X)	0.20	0.75	0.09	0.52	0.54	0.13	0.70	0.48	0.11	0.70	0.85	0.47
Avail Cap(c_a), veh/h	357	1851	825	265	1887	842	199	324	275	287	324	275
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.4	19.8	12.7	17.9	16.2	12.4	38.7	41.4	39.2	39.6	43.9	41.4
Incr Delay (d2), s/veh	0.3	2.8	0.2	1.8	1.1	0.3	10.6	1.3	0.2	7.6	16.3	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	12.3	0.9	1.3	7.4	1.3	3.6	3.0	0.5	2.1	6.7	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.7	22.6	12.9	19.7	17.3	12.7	49.3	42.7	39.4	47.3	60.2	42.9
LnGrp LOS	B	C	B	B	B	B	D	D	D	D	E	D
Approach Vol, veh/h		1523			1255			291			536	
Approach Delay, s/veh		21.7			17.1			45.6			51.9	
Approach LOS		C			B			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.2	61.0	12.0	21.8	9.2	62.1	12.0	21.8
Change Period (Y+Rc), s	5.0	* 6.3	* 5.8	* 6.8	5.0	* 6.3	5.0	* 6.8
Max Green Setting (Gmax), s	7.0	* 55	* 6.2	* 18	7.0	* 55	7.0	* 18
Max Q Clear Time (g_c+I1), s	5.3	34.2	8.2	14.4	3.6	21.9	9.0	8.6
Green Ext Time (p_c), s	0.0	9.8	0.0	0.5	0.0	8.0	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	26.5
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	25	522	16	6	579
Future Vol, veh/h	0	25	522	16	6	579
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	-	220	220	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	27	555	17	6	616

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	555	0	0	572	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	4.12	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	0	531	-	-	1001	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	531	-	-	1001	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

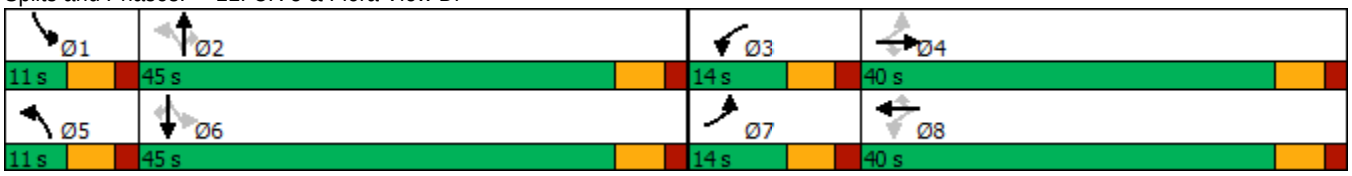
Approach	WB	NB	SB
HCM Control Delay, s	12.1	0	0.1
HCM LOS	B		

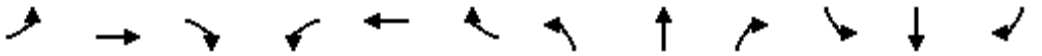
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	531	1001	-
HCM Lane V/C Ratio	-	-	0.05	0.006	-
HCM Control Delay (s)	-	-	12.1	8.6	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	88	175	162	33	84	118	433	140	107	458	14
Future Volume (vph)	20	88	175	162	33	84	118	433	140	107	458	14
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	25.0	25.0	5.0	25.0	25.0
Minimum Split (s)	11.0	40.0	40.0	11.0	40.0	40.0	11.0	36.0	36.0	11.0	36.0	36.0
Total Split (s)	14.0	40.0	40.0	14.0	40.0	40.0	11.0	45.0	45.0	11.0	45.0	45.0
Total Split (%)	12.7%	36.4%	36.4%	12.7%	36.4%	36.4%	10.0%	40.9%	40.9%	10.0%	40.9%	40.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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	None	None	None	None	None	None	Max	Max	None	Max	Max
Act Effct Green (s)	19.1	12.8	12.8	24.9	21.8	21.8	44.1	39.0	39.0	44.1	39.0	39.0
Actuated g/C Ratio	0.21	0.14	0.14	0.28	0.25	0.25	0.50	0.44	0.44	0.50	0.44	0.44
v/c Ratio	0.07	0.55	0.48	0.82	0.12	0.28	0.68	0.88	0.29	0.97	0.93	0.02
Control Delay	22.2	43.3	9.7	49.8	29.8	6.7	33.2	38.0	5.7	79.3	44.7	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	0.0
Total Delay	22.2	43.3	9.7	49.8	29.8	6.7	33.2	38.0	5.7	79.3	44.7	0.1
LOS	C	D	A	D	C	A	C	D	A	E	D	A
Approach Delay		24.4			34.5			30.5			50.4	
Approach LOS		C			C			C			D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 88.9	
Natural Cycle: 110	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 37.1	Intersection LOS: D
Intersection Capacity Utilization 61.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 11: CR 5 & Flora View Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	88	175	162	33	84	118	433	140	107	458	14
Future Volume (veh/h)	20	88	175	162	33	84	118	433	140	107	458	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	21	147	186	270	55	140	126	722	233	178	763	15
Peak Hour Factor	0.94	0.60	0.94	0.60	0.60	0.60	0.94	0.60	0.60	0.60	0.60	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	300	282	239	322	407	345	212	815	691	228	815	691
Arrive On Green	0.02	0.15	0.15	0.09	0.22	0.22	0.06	0.44	0.44	0.06	0.44	0.44
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	21	147	186	270	55	140	126	722	233	178	763	15
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.9	6.5	10.1	8.0	2.1	6.8	3.5	31.8	8.7	5.0	34.8	0.5
Cycle Q Clear(g_c), s	0.9	6.5	10.1	8.0	2.1	6.8	3.5	31.8	8.7	5.0	34.8	0.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	300	282	239	322	407	345	212	815	691	228	815	691
V/C Ratio(X)	0.07	0.52	0.78	0.84	0.14	0.41	0.59	0.89	0.34	0.78	0.94	0.02
Avail Cap(c_a), veh/h	419	710	602	322	710	602	212	815	691	228	815	691
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.9	35.0	36.6	32.2	28.2	30.1	20.4	23.2	16.7	20.6	24.1	14.4
Incr Delay (d2), s/veh	0.1	1.5	5.4	17.5	0.1	0.8	4.4	13.6	1.3	16.1	19.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	3.0	4.2	3.5	1.0	2.6	1.5	15.9	3.3	2.9	18.5	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.0	36.5	41.9	49.7	28.4	30.8	24.8	36.8	18.0	36.7	43.4	14.4
LnGrp LOS	C	D	D	D	C	C	C	D	B	D	D	B
Approach Vol, veh/h		354			465			1081			956	
Approach Delay, s/veh		39.0			41.5			31.3			41.7	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	45.0	14.0	19.5	11.0	45.0	8.0	25.5
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	39.0	8.0	34.0	5.0	39.0	8.0	34.0
Max Q Clear Time (g_c+I1), s	7.0	33.8	10.0	12.1	5.5	36.8	2.9	8.8
Green Ext Time (p_c), s	0.0	2.6	0.0	1.4	0.0	1.1	0.0	0.7

Intersection Summary	
HCM 6th Ctrl Delay	37.4
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	1	313	446	2
Future Vol, veh/h	0	0	1	313	446	2
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	1	333	474	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	810	475	476	0	-	0
Stage 1	475	-	-	-	-	-
Stage 2	335	-	-	-	-	-
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	349	590	1086	-	-	-
Stage 1	626	-	-	-	-	-
Stage 2	725	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	349	590	1086	-	-	-
Mov Cap-2 Maneuver	349	-	-	-	-	-
Stage 1	625	-	-	-	-	-
Stage 2	725	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1086	-	-	-	-
HCM Lane V/C Ratio	0.001	-	-	-	-
HCM Control Delay (s)	8.3	0	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	65	35	10	249	439	7
Future Vol, veh/h	65	35	10	249	439	7
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	220	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	69	37	11	265	467	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	754	467	474	0	-	0
Stage 1	467	-	-	-	-	-
Stage 2	287	-	-	-	-	-
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	377	596	1088	-	-	-
Stage 1	631	-	-	-	-	-
Stage 2	762	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	373	596	1088	-	-	-
Mov Cap-2 Maneuver	373	-	-	-	-	-
Stage 1	625	-	-	-	-	-
Stage 2	762	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.9	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1088	-	373	596	-	-
HCM Lane V/C Ratio	0.01	-	0.185	0.062	-	-
HCM Control Delay (s)	8.3	-	16.8	11.4	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0.7	0.2	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	22	9	259	468	5
Future Vol, veh/h	0	22	9	259	468	5
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	220	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	23	10	276	498	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	501	503	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	4.12	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	0	570	1061	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	570	1061	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.6	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1061	-	570	-	-
HCM Lane V/C Ratio	0.009	-	0.041	-	-
HCM Control Delay (s)	8.4	-	11.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	36	12	268	468	22
Future Vol, veh/h	0	36	12	268	468	22
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	220	-	-	220
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	38	13	285	498	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	498	521	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	4.12	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	0	572	1045	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	572	1045	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.7	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1045	-	572	-	-
HCM Lane V/C Ratio	0.012	-	0.067	-	-
HCM Control Delay (s)	8.5	-	11.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	3.5
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	71	55	89	127
Demand Flow Rate, veh/h	73	56	90	129
Vehicles Circulating, veh/h	133	71	53	69
Vehicles Exiting, veh/h	65	72	153	58
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.6	3.2	3.3	3.7
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	73	56	90	129
Cap Entry Lane, veh/h	1205	1283	1307	1286
Entry HV Adj Factor	0.976	0.987	0.989	0.984
Flow Entry, veh/h	71	55	89	127
Cap Entry, veh/h	1176	1266	1293	1265
V/C Ratio	0.061	0.044	0.069	0.100
Control Delay, s/veh	3.6	3.2	3.3	3.7
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	66	9	4	15	15	19
Future Vol, veh/h	66	9	4	15	15	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	70	10	4	16	16	20

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	80	0	99	75
Stage 1	-	-	-	-	75	-
Stage 2	-	-	-	-	24	-
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	-	-	1518	-	900	986
Stage 1	-	-	-	-	948	-
Stage 2	-	-	-	-	999	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1518	-	897	986
Mov Cap-2 Maneuver	-	-	-	-	897	-
Stage 1	-	-	-	-	948	-
Stage 2	-	-	-	-	996	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	8.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	897	986	-	-	1518	-
HCM Lane V/C Ratio	0.018	0.02	-	-	0.003	-
HCM Control Delay (s)	9.1	8.7	-	-	7.4	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	6	685	46	43	752
Future Vol, veh/h	4	6	685	46	43	752
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	-	-	0	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	7	835	56	52	917

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1398	418	0	0	891	0
Stage 1	835	-	-	-	-	-
Stage 2	563	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	132	584	-	-	757	-
Stage 1	386	-	-	-	-	-
Stage 2	534	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	123	584	-	-	757	-
Mov Cap-2 Maneuver	123	-	-	-	-	-
Stage 1	386	-	-	-	-	-
Stage 2	497	-	-	-	-	-

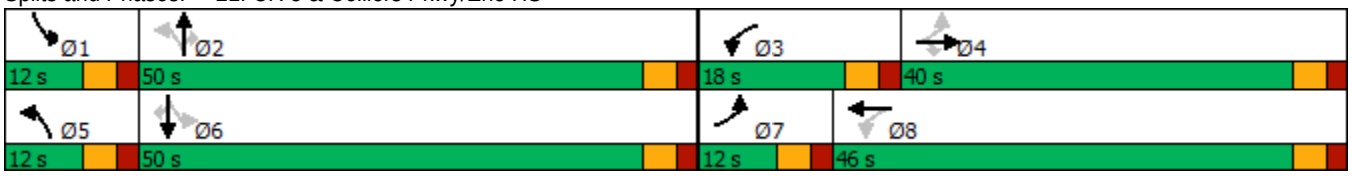
Approach	WB	NB	SB
HCM Control Delay, s	21.2	0	0.5
HCM LOS	C		

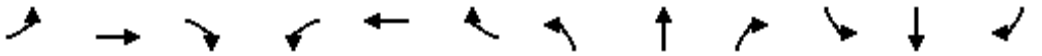
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	234	757	-
HCM Lane V/C Ratio	-	-	0.052	0.069	-
HCM Control Delay (s)	-	-	21.2	10.1	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0.2	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	182	131	207	222	67	47	459	112	129	600	27
Future Volume (vph)	182	131	207	222	67	47	459	112	129	600	27
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	15.0	15.0	5.0	10.0	5.0	15.0	15.0	5.0	10.0	10.0
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0
Total Split (s)	12.0	40.0	40.0	18.0	46.0	12.0	50.0	50.0	12.0	50.0	50.0
Total Split (%)	10.0%	33.3%	33.3%	15.0%	38.3%	10.0%	41.7%	41.7%	10.0%	41.7%	41.7%
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)	24.3	17.2	17.2	35.3	23.3	51.5	45.0	45.0	53.3	47.7	47.7
Actuated g/C Ratio	0.24	0.17	0.17	0.35	0.23	0.50	0.44	0.44	0.52	0.47	0.47
v/c Ratio	0.63	0.61	0.52	0.88	0.52	0.16	0.43	0.21	0.49	0.53	0.04
Control Delay	37.7	48.0	13.2	54.2	29.6	12.4	21.2	3.7	17.1	21.9	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	37.7	48.0	13.2	54.2	29.6	12.4	21.2	3.7	17.1	21.9	0.1
LOS	D	D	B	D	C	B	C	A	B	C	A
Approach Delay		32.0			44.1		17.4			20.5	
Approach LOS		C			D		B			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 102.3	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 26.0	Intersection LOS: C
Intersection Capacity Utilization 62.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 21: CR 5 & Colliers Pkwy/Erie HS





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	182	131	207	222	67	90	47	459	112	129	600	27
Future Volume (veh/h)	182	131	207	222	67	90	47	459	112	129	600	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	194	190	220	322	97	130	50	665	162	187	870	29
Peak Hour Factor	0.94	0.69	0.94	0.69	0.69	0.69	0.94	0.69	0.69	0.69	0.69	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	318	318	270	388	166	222	327	1561	696	431	1672	746
Arrive On Green	0.07	0.17	0.17	0.13	0.23	0.23	0.04	0.44	0.44	0.07	0.47	0.47
Sat Flow, veh/h	1781	1870	1585	1781	725	971	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	194	190	220	322	0	227	50	665	162	187	870	29
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1696	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	7.0	9.6	13.7	13.0	0.0	12.2	1.5	13.2	6.5	5.9	17.6	1.0
Cycle Q Clear(g_c), s	7.0	9.6	13.7	13.0	0.0	12.2	1.5	13.2	6.5	5.9	17.6	1.0
Prop In Lane	1.00		1.00	1.00		0.57	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	318	318	270	388	0	388	327	1561	696	431	1672	746
V/C Ratio(X)	0.61	0.60	0.82	0.83	0.00	0.59	0.15	0.43	0.23	0.43	0.52	0.04
Avail Cap(c_a), veh/h	318	639	542	388	0	679	382	1561	696	431	1672	746
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.2	39.3	40.9	31.9	0.0	35.2	15.5	19.8	17.9	14.9	19.0	14.6
Incr Delay (d2), s/veh	3.3	1.8	5.9	14.1	0.0	1.4	0.2	0.9	0.8	0.7	1.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	4.5	5.7	3.0	0.0	5.1	0.6	5.5	2.5	2.4	7.3	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.6	41.0	46.9	46.0	0.0	36.6	15.8	20.7	18.7	15.6	20.2	14.7
LnGrp LOS	D	D	D	D	A	D	B	C	B	B	C	B
Approach Vol, veh/h		604			549			877			1086	
Approach Delay, s/veh		42.4			42.1			20.0			19.2	
Approach LOS		D			D			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	50.0	18.0	22.4	8.8	53.2	12.0	28.4
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	45.0	13.0	35.0	7.0	45.0	7.0	41.0
Max Q Clear Time (g_c+I1), s	7.9	15.2	15.0	15.7	3.5	19.6	9.0	14.2
Green Ext Time (p_c), s	0.0	5.7	0.0	1.7	0.0	6.9	0.0	1.4

Intersection Summary	
HCM 6th Ctrl Delay	28.0
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	49	3	0	38	0	624	334	101	948	3
Future Vol, veh/h	0	0	49	3	0	38	0	624	334	101	948	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	-	-	0	-	-	-	-	-	250	125	-	120
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	68	68	68	94	68	68	68	68	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	52	4	0	56	0	918	491	149	1394	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	697	1913	2613	459	-	0	0	1409	0	0
Stage 1	-	-	-	918	918	-	-	-	-	-	-	-
Stage 2	-	-	-	995	1695	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	7.54	6.54	6.94	-	-	-	4.14	-	-
Critical Hdwy Stg 1	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	3.52	4.02	3.32	-	-	-	2.22	-	-
Pot Cap-1 Maneuver	0	0	383	41	24	549	0	-	-	480	-	-
Stage 1	0	0	-	292	349	-	0	-	-	-	-	-
Stage 2	0	0	-	262	147	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	383	27	17	549	-	-	-	480	-	-
Mov Cap-2 Maneuver	-	-	-	27	17	-	-	-	-	-	-	-
Stage 1	-	-	-	292	349	-	-	-	-	-	-	-
Stage 2	-	-	-	156	101	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.9	26.5	0	1.5
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	383	227	480	-	-
HCM Lane V/C Ratio	-	-	0.136	0.266	0.309	-	-
HCM Control Delay (s)	-	-	15.9	26.5	15.8	-	-
HCM Lane LOS	-	-	C	D	C	-	-
HCM 95th %tile Q(veh)	-	-	0.5	1	1.3	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	1	96	5	2	246
Future Vol, veh/h	16	1	96	5	2	246
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	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	1	102	5	2	262

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	371	105	0	0	107	0
Stage 1	105	-	-	-	-	-
Stage 2	266	-	-	-	-	-
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	630	949	-	-	1484	-
Stage 1	919	-	-	-	-	-
Stage 2	779	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	629	949	-	-	1484	-
Mov Cap-2 Maneuver	629	-	-	-	-	-
Stage 1	919	-	-	-	-	-
Stage 2	778	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	642	1484	-
HCM Lane V/C Ratio	-	-	0.028	0.001	-
HCM Control Delay (s)	-	-	10.8	7.4	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	20	20	0	0	20	128	17	0	133	1
Future Vol, veh/h	3	0	20	20	0	0	20	128	17	0	133	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	21	21	0	0	21	136	18	0	141	1
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.3	8	8.2	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	12%	13%	100%	0%
Vol Thru, %	78%	0%	0%	99%
Vol Right, %	10%	87%	0%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	165	23	20	134
LT Vol	20	3	20	0
Through Vol	128	0	0	133
RT Vol	17	20	0	1
Lane Flow Rate	176	24	21	143
Geometry Grp	1	1	1	1
Degree of Util (X)	0.199	0.028	0.029	0.164
Departure Headway (Hd)	4.085	4.153	4.852	4.142
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	871	867	742	857
Service Time	2.148	2.154	2.853	2.212
HCM Lane V/C Ratio	0.202	0.028	0.028	0.167
HCM Control Delay	8.2	7.3	8	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.1	0.1	0.6

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	279	147	566	624
Demand Flow Rate, veh/h	284	150	577	637
Vehicles Circulating, veh/h	630	555	223	296
Vehicles Exiting, veh/h	303	245	691	409
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	10.2	6.8	9.6	12.5
Approach LOS	B	A	A	B

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	284	150	577	637
Cap Entry Lane, veh/h	726	783	1099	1020
Entry HV Adj Factor	0.982	0.980	0.981	0.980
Flow Entry, veh/h	279	147	566	624
Cap Entry, veh/h	712	768	1078	999
V/C Ratio	0.391	0.191	0.525	0.624
Control Delay, s/veh	10.2	6.8	9.6	12.5
LOS	B	A	A	B
95th %tile Queue, veh	2	1	3	5

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	214	10	19	138	0	11
Future Vol, veh/h	214	10	19	138	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	220	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	228	11	20	147	0	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	239	0	-	234
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.12	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.218	-	-	3.318
Pot Cap-1 Maneuver	-	-	1328	-	0	805
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1328	-	-	805
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	805	-	-	1328	-
HCM Lane V/C Ratio	0.015	-	-	0.015	-
HCM Control Delay (s)	9.5	-	-	7.8	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	182	44	27	132	25	16
Future Vol, veh/h	182	44	27	132	25	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	220	220	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	194	47	29	140	27	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	241	0	392	194
Stage 1	-	-	-	-	194	-
Stage 2	-	-	-	-	198	-
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	-	-	1326	-	612	847
Stage 1	-	-	-	-	839	-
Stage 2	-	-	-	-	835	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1326	-	599	847
Mov Cap-2 Maneuver	-	-	-	-	599	-
Stage 1	-	-	-	-	839	-
Stage 2	-	-	-	-	817	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	599	847	-	-	1326	-
HCM Lane V/C Ratio	0.044	0.02	-	-	0.022	-
HCM Control Delay (s)	11.3	9.3	-	-	7.8	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	50	111	24	53	6	62	433	17	3	434	42
Future Vol, veh/h	38	50	111	24	53	6	62	433	17	3	434	42
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	220	-	-	220	-	-	-	-	220	-	-	220
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	40	53	118	26	56	6	66	461	18	3	462	45

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1101	1079	462	1169	1106	461	507	0	0	479	0	0
Stage 1	468	468	-	593	593	-	-	-	-	-	-	-
Stage 2	633	611	-	576	513	-	-	-	-	-	-	-
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	189	218	600	170	210	600	1058	-	-	1083	-	-
Stage 1	575	561	-	492	493	-	-	-	-	-	-	-
Stage 2	468	484	-	503	536	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	135	199	600	101	191	600	1058	-	-	1083	-	-
Mov Cap-2 Maneuver	135	199	-	101	191	-	-	-	-	-	-	-
Stage 1	526	559	-	450	451	-	-	-	-	-	-	-
Stage 2	371	443	-	364	534	-	-	-	-	-	-	-

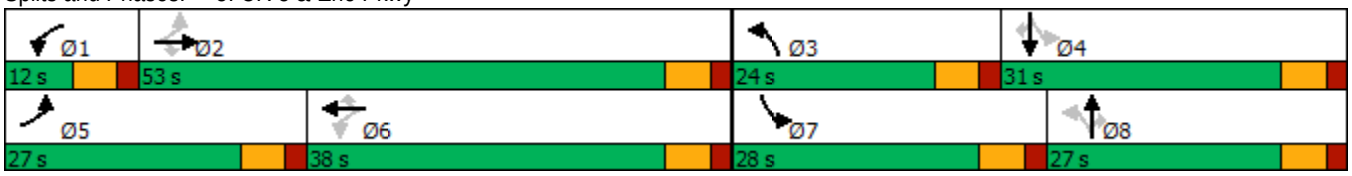
Approach	EB	WB	NB	SB
HCM Control Delay, s	26.7	36.5	1	0.1
HCM LOS	D	E		

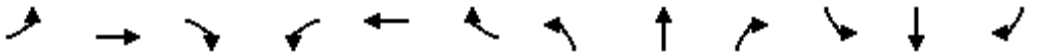
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1058	-	-	135	369	101	205	1083	-	-
HCM Lane V/C Ratio	0.062	-	-	0.299	0.464	0.253	0.306	0.003	-	-
HCM Control Delay (s)	8.6	0	-	42.7	22.9	52.3	30.1	8.3	0	-
HCM Lane LOS	A	A	-	E	C	F	D	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1.2	2.4	0.9	1.2	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	287	1322	368	82	811	430	294	391	140	382	304	208
Future Volume (vph)	287	1322	368	82	811	430	294	391	140	382	304	208
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	25.0	25.0	5.0	25.0	25.0	5.0	8.0	8.0	5.0	8.0	8.0
Minimum Split (s)	11.0	31.0	31.0	11.0	31.0	31.0	11.0	14.0	14.0	11.0	14.0	14.0
Total Split (s)	27.0	53.0	53.0	12.0	38.0	38.0	24.0	27.0	27.0	28.0	31.0	31.0
Total Split (%)	22.5%	44.2%	44.2%	10.0%	31.7%	31.7%	20.0%	22.5%	22.5%	23.3%	25.8%	25.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	57.4	48.0	48.0	38.9	33.0	33.0	34.0	17.5	17.5	44.2	23.1	23.1
Actuated g/C Ratio	0.50	0.42	0.42	0.34	0.29	0.29	0.30	0.15	0.15	0.38	0.20	0.20
v/c Ratio	0.88	0.95	0.47	0.57	0.85	0.60	0.76	0.77	0.37	0.97	0.46	0.45
Control Delay	55.1	48.3	8.8	36.1	48.7	8.4	40.3	57.5	5.1	69.4	43.5	8.3
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	55.1	48.3	8.8	36.1	48.7	8.4	40.3	57.5	5.1	69.4	43.5	8.3
LOS	E	D	A	D	D	A	D	E	A	E	D	A
Approach Delay		41.9			34.9			42.5			46.4	
Approach LOS		D			C			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 115	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 40.9	Intersection LOS: D
Intersection Capacity Utilization 93.1%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 5: CR 5 & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	287	1322	368	82	811	430	294	391	140	382	304	208
Future Volume (veh/h)	287	1322	368	82	811	430	294	391	140	382	304	208
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	305	1406	391	87	863	457	313	416	149	406	323	221
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	339	1460	651	152	1170	522	424	499	223	428	624	278
Arrive On Green	0.13	0.41	0.41	0.05	0.33	0.33	0.16	0.14	0.14	0.19	0.18	0.18
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	305	1406	391	87	863	457	313	416	149	406	323	221
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	12.4	44.1	22.1	3.7	24.6	31.1	17.1	13.0	10.2	22.0	9.4	15.3
Cycle Q Clear(g_c), s	12.4	44.1	22.1	3.7	24.6	31.1	17.1	13.0	10.2	22.0	9.4	15.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	339	1460	651	152	1170	522	424	499	223	428	624	278
V/C Ratio(X)	0.90	0.96	0.60	0.57	0.74	0.88	0.74	0.83	0.67	0.95	0.52	0.79
Avail Cap(c_a), veh/h	437	1460	651	163	1170	522	424	652	291	428	777	346
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.9	32.8	26.4	29.5	34.0	36.2	34.4	47.8	46.6	34.3	42.8	45.2
Incr Delay (d2), s/veh	15.8	16.2	4.1	2.2	4.2	18.3	6.0	5.6	1.7	30.4	0.2	7.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	20.7	8.6	1.6	10.7	14.1	7.8	6.0	4.0	12.9	4.0	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.7	49.1	30.4	31.7	38.2	54.5	40.4	53.4	48.3	64.6	43.0	52.9
LnGrp LOS	D	D	C	C	D	D	D	D	D	E	D	D
Approach Vol, veh/h		2102			1407			878			950	
Approach Delay, s/veh		44.4			43.1			47.9			54.5	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.3	53.0	24.0	26.1	20.7	43.7	28.0	22.1
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	47.0	18.0	25.0	21.0	32.0	22.0	21.0
Max Q Clear Time (g_c+I1), s	5.7	46.1	19.1	17.3	14.4	33.1	24.0	15.0
Green Ext Time (p_c), s	0.0	0.8	0.0	1.1	0.2	0.0	0.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	46.4
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱	↰	↑↑	↱			↱			↱
Traffic Vol, veh/h	0	1770	75	89	1280	17	0	0	80	0	0	42
Future Vol, veh/h	0	1770	75	89	1280	17	0	0	80	0	0	42
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	-	-	220	110	-	220	-	-	0	-	-	0
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	0	1883	80	95	1362	18	0	0	85	0	0	45

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	1963	0	0	-	-	942	-	-	681
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	4.14	-	-	-	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	2.22	-	-	-	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	293	-	-	0	0	264	0	0	393
Stage 1	0	-	-	-	-	-	0	0	-	0	0	-
Stage 2	0	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	293	-	-	-	-	264	-	-	393
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

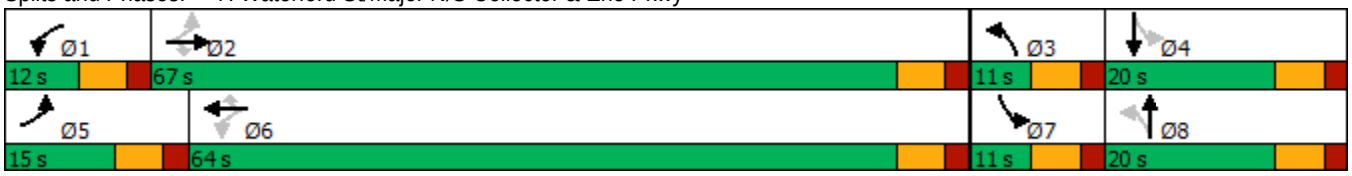
Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.5	25	15.3
HCM LOS			D	C

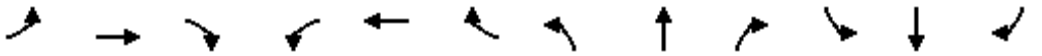
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	264	-	-	293	-	-	393
HCM Lane V/C Ratio	0.322	-	-	0.323	-	-	0.114
HCM Control Delay (s)	25	-	-	23	-	-	15.3
HCM Lane LOS	D	-	-	C	-	-	C
HCM 95th %tile Q(veh)	1.3	-	-	1.4	-	-	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	148	1550	152	100	1209	161	116	0	106	0
Future Volume (vph)	148	1550	152	100	1209	161	116	0	106	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6		3	8	7	4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	7	4
Switch Phase										
Minimum Initial (s)	5.0	25.0	25.0	5.0	25.0	25.0	5.0	8.0	5.0	8.0
Minimum Split (s)	11.0	31.0	31.0	11.0	31.0	31.0	11.0	20.0	11.0	20.0
Total Split (s)	15.0	67.0	67.0	12.0	64.0	64.0	11.0	20.0	11.0	20.0
Total Split (%)	13.6%	60.9%	60.9%	10.9%	58.2%	58.2%	10.0%	18.2%	10.0%	18.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	Max	None	Max
Act Effct Green (s)	69.4	61.0	61.0	64.6	58.6	58.6	19.0	14.0	19.0	14.0
Actuated g/C Ratio	0.63	0.55	0.55	0.59	0.53	0.53	0.17	0.13	0.17	0.13
v/c Ratio	0.61	0.84	0.17	0.65	0.68	0.19	0.49	0.32	0.47	0.20
Control Delay	19.7	25.5	2.8	35.4	21.3	2.5	44.8	5.3	43.9	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.7	25.5	2.8	35.4	21.3	2.5	44.8	5.3	43.9	1.3
LOS	B	C	A	D	C	A	D	A	D	A
Approach Delay		23.2			20.2			26.4		28.2
Approach LOS		C			C			C		C

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 22.4	Intersection LOS: C
Intersection Capacity Utilization 76.5%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 7: Waterford St/Major N/S Collector & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	1550	152	100	1209	161	116	0	101	106	0	62
Future Volume (veh/h)	148	1550	152	100	1209	161	116	0	101	106	0	62
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	157	1649	162	106	1286	171	123	0	107	113	0	66
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	274	1992	889	191	1947	868	269	0	204	232	0	204
Arrive On Green	0.06	0.56	0.56	0.04	0.55	0.55	0.05	0.00	0.13	0.05	0.00	0.13
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	0	1585	1781	0	1585
Grp Volume(v), veh/h	157	1649	162	106	1286	171	123	0	107	113	0	66
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	0	1585	1781	0	1585
Q Serve(g_s), s	4.2	41.4	5.4	2.8	27.9	5.9	5.0	0.0	6.9	5.0	0.0	4.1
Cycle Q Clear(g_c), s	4.2	41.4	5.4	2.8	27.9	5.9	5.0	0.0	6.9	5.0	0.0	4.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	274	1992	889	191	1947	868	269	0	204	232	0	204
V/C Ratio(X)	0.57	0.83	0.18	0.55	0.66	0.20	0.46	0.00	0.52	0.49	0.00	0.32
Avail Cap(c_a), veh/h	320	1992	889	211	1947	868	269	0	204	232	0	204
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.6	19.6	11.7	21.6	17.4	12.5	40.9	0.0	44.3	40.9	0.0	43.1
Incr Delay (d2), s/veh	1.9	4.1	0.5	2.5	1.8	0.5	1.2	0.0	9.3	1.6	0.0	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	15.8	2.0	1.4	10.4	2.2	0.7	0.0	3.2	0.5	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.5	23.7	12.1	24.2	19.2	13.0	42.1	0.0	53.6	42.5	0.0	47.3
LnGrp LOS	B	C	B	C	B	B	D	A	D	D	A	D
Approach Vol, veh/h		1968			1563			230			179	
Approach Delay, s/veh		22.3			18.9			47.5			44.3	
Approach LOS		C			B			D			D	

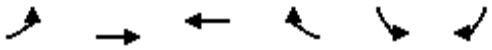
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	67.0	11.0	20.0	12.2	65.6	11.0	20.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	61.0	5.0	14.0	9.0	58.0	5.0	14.0
Max Q Clear Time (g_c+I1), s	4.8	43.4	7.0	6.1	6.2	29.9	7.0	8.9
Green Ext Time (p_c), s	0.0	11.1	0.0	0.1	0.1	10.7	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	23.4
HCM 6th LOS	C

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	210	1546	1296	178	187	173
Future Volume (vph)	210	1546	1296	178	187	173
Turn Type	pm+pt	NA	NA	Perm	Prot	Prot
Protected Phases	5	2	6		4	4
Permitted Phases	2			6		
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	20.0	20.0	20.0	10.0	10.0
Total Split (s)	12.0	80.0	68.0	68.0	30.0	30.0
Total Split (%)	10.9%	72.7%	61.8%	61.8%	27.3%	27.3%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	Max	Max	Max	None	None
Act Effct Green (s)	75.1	75.1	63.1	63.1	16.6	16.6
Actuated g/C Ratio	0.74	0.74	0.62	0.62	0.16	0.16
v/c Ratio	0.82	0.63	0.63	0.18	0.69	0.48
Control Delay	34.8	8.5	14.3	1.9	52.9	14.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.8	8.5	14.3	1.9	52.9	14.4
LOS	C	A	B	A	D	B
Approach Delay		11.6	12.8		34.4	
Approach LOS		B	B		C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 101.7	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 14.4	Intersection LOS: B
Intersection Capacity Utilization 70.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 8: Erie Pkwy & Minor N/S Collector



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	210	1546	1296	178	187	173
Future Volume (veh/h)	210	1546	1296	178	187	173
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	223	1645	1379	189	199	184
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	318	2688	2296	1024	254	226
Arrive On Green	0.06	0.76	0.65	0.65	0.14	0.14
Sat Flow, veh/h	1781	3647	3647	1585	1781	1585
Grp Volume(v), veh/h	223	1645	1379	189	199	184
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1781	1585
Q Serve(g_s), s	3.9	20.8	22.2	4.7	10.7	11.2
Cycle Q Clear(g_c), s	3.9	20.8	22.2	4.7	10.7	11.2
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	318	2688	2296	1024	254	226
V/C Ratio(X)	0.70	0.61	0.60	0.18	0.78	0.81
Avail Cap(c_a), veh/h	337	2688	2296	1024	449	400
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.3	5.5	10.1	7.0	41.0	41.2
Incr Delay (d2), s/veh	6.0	1.0	1.2	0.4	5.3	7.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	4.9	7.1	1.4	5.0	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	19.3	6.5	11.3	7.4	46.3	48.2
LnGrp LOS	B	A	B	A	D	D
Approach Vol, veh/h		1868	1568		383	
Approach Delay, s/veh		8.0	10.8		47.2	
Approach LOS		A	B		D	

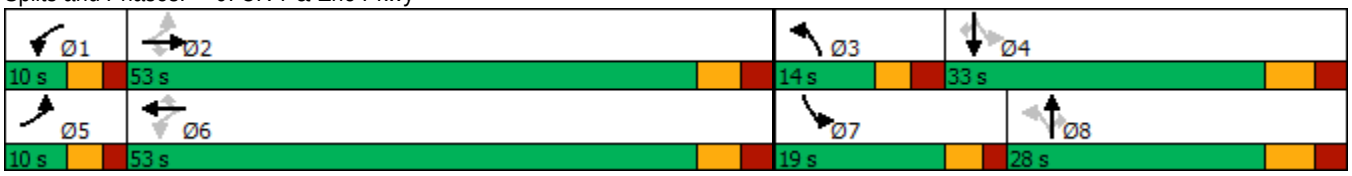
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		80.0		19.1	10.9	69.1
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		75.0		25.0	7.0	63.0
Max Q Clear Time (g_c+I1), s		22.8		13.2	5.9	24.2
Green Ext Time (p_c), s		17.7		1.0	0.1	13.2

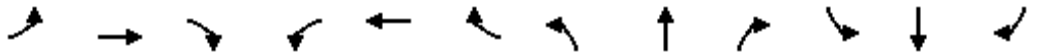
Intersection Summary		
HCM 6th Ctrl Delay		13.1
HCM 6th LOS		B

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	1540	118	108	1270	129	136	328	66	279	200	68
Future Volume (vph)	74	1540	118	108	1270	129	136	328	66	279	200	68
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.0	16.3	16.3	10.0	16.3	16.3	10.8	16.8	16.8	10.0	16.8	16.8
Total Split (s)	10.0	53.0	53.0	10.0	53.0	53.0	14.0	28.0	28.0	19.0	33.0	33.0
Total Split (%)	9.1%	48.2%	48.2%	9.1%	48.2%	48.2%	12.7%	25.5%	25.5%	17.3%	30.0%	30.0%
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.5	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	2.8	2.8	2.8	2.0	2.8	2.8
Lost Time Adjust (s)	0.0	-3.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	-1.0	0.0	0.0
Total Lost Time (s)	5.0	3.3	6.3	5.0	3.3	6.3	5.8	6.8	6.8	4.0	6.8	6.8
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)	53.0	49.7	46.7	54.0	51.7	48.7	30.3	21.2	21.2	43.0	26.3	26.3
Actuated g/C Ratio	0.48	0.45	0.42	0.49	0.47	0.44	0.28	0.19	0.19	0.39	0.24	0.24
v/c Ratio	0.52	1.00	0.16	0.76	0.80	0.17	0.39	0.95	0.17	0.91	0.47	0.15
Control Delay	26.1	54.1	2.6	48.8	29.8	3.3	28.0	81.8	0.8	58.6	40.0	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	0.0
Total Delay	26.1	54.1	2.6	48.8	29.8	3.3	28.0	81.8	0.8	58.6	40.0	0.6
LOS	C	D	A	D	C	A	C	F	A	E	D	A
Approach Delay		49.4			28.9			57.9			44.6	
Approach LOS		D			C			E			D	

Intersection Summary		
Cycle Length: 110		
Actuated Cycle Length: 110		
Natural Cycle: 100		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 1.00		
Intersection Signal Delay: 42.7	Intersection LOS: D	
Intersection Capacity Utilization 97.8%	ICU Level of Service F	
Analysis Period (min) 15		

Splits and Phases: 9: CR 7 & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	1540	118	108	1270	129	136	328	66	279	200	68
Future Volume (veh/h)	74	1540	118	108	1270	129	136	328	66	279	200	68
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	77	1604	123	112	1323	134	142	342	69	291	208	71
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	177	1606	673	146	1621	680	355	360	305	329	445	378
Arrive On Green	0.04	0.45	0.42	0.05	0.46	0.43	0.07	0.19	0.19	0.14	0.24	0.24
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	77	1604	123	112	1323	134	142	342	69	291	208	71
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.7	49.6	5.3	3.9	35.5	5.8	7.0	19.9	4.0	13.8	10.5	3.9
Cycle Q Clear(g_c), s	2.7	49.6	5.3	3.9	35.5	5.8	7.0	19.9	4.0	13.8	10.5	3.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	177	1606	673	146	1621	680	355	360	305	329	445	378
V/C Ratio(X)	0.43	1.00	0.18	0.76	0.82	0.20	0.40	0.95	0.23	0.88	0.47	0.19
Avail Cap(c_a), veh/h	185	1606	673	146	1621	680	355	360	305	329	445	378
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.5	30.1	19.7	26.4	25.9	19.6	32.2	43.9	37.5	29.8	35.9	33.4
Incr Delay (d2), s/veh	1.7	22.2	0.6	21.1	4.7	0.6	0.7	34.2	0.4	23.6	0.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	23.9	2.0	2.3	14.6	2.2	3.0	12.3	1.6	7.7	4.7	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.1	52.3	20.3	47.5	30.6	20.2	33.0	78.1	37.8	53.4	36.7	33.7
LnGrp LOS	C	D	C	D	C	C	C	E	D	D	D	C
Approach Vol, veh/h		1804			1569			553			570	
Approach Delay, s/veh		49.0			30.9			61.5			44.8	
Approach LOS		D			C			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	53.0	14.0	33.0	9.5	53.5	19.0	28.0
Change Period (Y+Rc), s	5.0	* 6.3	* 5.8	* 6.8	5.0	* 6.3	5.0	* 6.8
Max Green Setting (Gmax), s	5.0	* 47	* 8.2	* 26	5.0	* 47	14.0	* 21
Max Q Clear Time (g_c+I1), s	5.9	51.6	9.0	12.5	4.7	37.5	15.8	21.9
Green Ext Time (p_c), s	0.0	0.0	0.0	1.0	0.0	5.7	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	43.7
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	15	517	51	20	618
Future Vol, veh/h	0	15	517	51	20	618
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	-	220	220	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	16	550	54	21	657

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	550	0	0	604	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	4.12	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	0	535	-	-	974	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	535	-	-	974	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

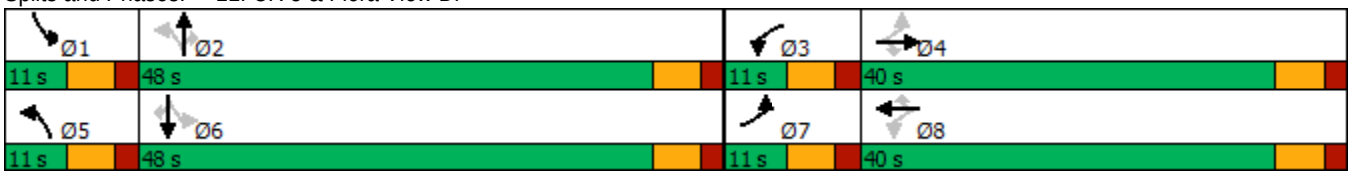
Approach	WB	NB	SB
HCM Control Delay, s	11.9	0	0.3
HCM LOS	B		

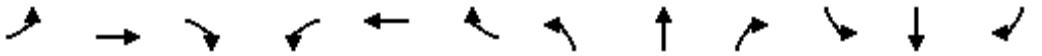
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	535	974	-
HCM Lane V/C Ratio	-	-	0.03	0.022	-
HCM Control Delay (s)	-	-	11.9	8.8	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	15	106	81	10	48	140	507	83	65	533	20
Future Volume (vph)	13	15	106	81	10	48	140	507	83	65	533	20
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	25.0	25.0	5.0	25.0	25.0
Minimum Split (s)	11.0	40.0	40.0	11.0	40.0	40.0	11.0	36.0	36.0	11.0	36.0	36.0
Total Split (s)	11.0	40.0	40.0	11.0	40.0	40.0	11.0	48.0	48.0	11.0	48.0	48.0
Total Split (%)	10.0%	36.4%	36.4%	10.0%	36.4%	36.4%	10.0%	43.6%	43.6%	10.0%	43.6%	43.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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	None	None	None	None	None	None	Max	Max	None	Max	Max
Act Effct Green (s)	12.7	10.1	10.1	16.1	16.4	16.4	50.4	48.1	48.1	48.9	43.8	43.8
Actuated g/C Ratio	0.16	0.12	0.12	0.20	0.20	0.20	0.62	0.59	0.59	0.60	0.54	0.54
v/c Ratio	0.06	0.07	0.35	0.33	0.03	0.12	0.35	0.49	0.09	0.15	0.57	0.02
Control Delay	25.7	34.8	6.2	30.4	30.1	0.5	9.5	16.3	0.6	7.6	17.8	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	0.0
Total Delay	25.7	34.8	6.2	30.4	30.1	0.5	9.5	16.3	0.6	7.6	17.8	0.1
LOS	C	C	A	C	C	A	A	B	A	A	B	A
Approach Delay		11.3			20.1			13.3			16.1	
Approach LOS		B			C			B			B	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 81.5	
Natural Cycle: 100	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.57	
Intersection Signal Delay: 14.8	Intersection LOS: B
Intersection Capacity Utilization 62.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 11: CR 5 & Flora View Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	15	106	81	10	48	140	507	83	65	533	20
Future Volume (veh/h)	13	15	106	81	10	48	140	507	83	65	533	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	14	16	113	86	11	51	149	539	88	69	567	21
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	268	216	183	321	292	247	409	937	794	406	916	776
Arrive On Green	0.02	0.12	0.12	0.06	0.16	0.16	0.06	0.50	0.50	0.05	0.49	0.49
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	14	16	113	86	11	51	149	539	88	69	567	21
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.6	0.7	5.8	3.6	0.4	2.4	3.5	17.3	2.5	1.6	19.1	0.6
Cycle Q Clear(g_c), s	0.6	0.7	5.8	3.6	0.4	2.4	3.5	17.3	2.5	1.6	19.1	0.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	268	216	183	321	292	247	409	937	794	406	916	776
V/C Ratio(X)	0.05	0.07	0.62	0.27	0.04	0.21	0.36	0.58	0.11	0.17	0.62	0.03
Avail Cap(c_a), veh/h	343	741	628	324	741	628	409	937	794	426	916	776
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.6	33.8	36.1	30.9	30.7	31.6	12.2	15.0	11.3	11.3	16.0	11.3
Incr Delay (d2), s/veh	0.1	0.1	3.3	0.4	0.1	0.4	0.5	2.6	0.3	0.2	3.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.3	2.4	1.6	0.2	0.9	1.2	7.0	0.9	0.6	7.8	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.6	34.0	39.5	31.3	30.8	32.0	12.7	17.6	11.6	11.5	19.2	11.4
LnGrp LOS	C	C	D	C	C	C	B	B	B	B	B	B
Approach Vol, veh/h		143			148			776			657	
Approach Delay, s/veh		38.2			31.5			16.0			18.1	
Approach LOS		D			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	49.0	10.9	15.9	11.0	48.0	7.4	19.4
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	42.0	5.0	34.0	5.0	42.0	5.0	34.0
Max Q Clear Time (g_c+I1), s	3.6	19.3	5.6	7.8	5.5	21.1	2.6	4.4
Green Ext Time (p_c), s	0.0	3.4	0.0	0.4	0.0	3.4	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	20.0
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1	2	512	568	1
Future Vol, veh/h	0	1	2	512	568	1
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	2	545	604	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1154	605	605	0	-	0
Stage 1	605	-	-	-	-	-
Stage 2	549	-	-	-	-	-
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	218	498	973	-	-	-
Stage 1	545	-	-	-	-	-
Stage 2	579	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	217	498	973	-	-	-
Mov Cap-2 Maneuver	217	-	-	-	-	-
Stage 1	543	-	-	-	-	-
Stage 2	579	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	973	-	498	-	-
HCM Lane V/C Ratio	0.002	-	0.002	-	-
HCM Control Delay (s)	8.7	0	12.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	65	22	31	449	549	21
Future Vol, veh/h	65	22	31	449	549	21
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	220	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	69	23	33	478	584	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1128	584	606	0	-	0
Stage 1	584	-	-	-	-	-
Stage 2	544	-	-	-	-	-
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	226	512	972	-	-	-
Stage 1	557	-	-	-	-	-
Stage 2	582	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	218	512	972	-	-	-
Mov Cap-2 Maneuver	218	-	-	-	-	-
Stage 1	538	-	-	-	-	-
Stage 2	582	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	24.8	0.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	972	-	218	512	-	-
HCM Lane V/C Ratio	0.034	-	0.317	0.046	-	-
HCM Control Delay (s)	8.8	-	29	12.4	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.3	0.1	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	15	22	480	556	14
Future Vol, veh/h	0	15	22	480	556	14
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	220	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	16	23	511	591	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	599	606	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	4.12	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	0	502	972	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	502	972	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.4	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	972	-	502	-	-
HCM Lane V/C Ratio	0.024	-	0.032	-	-
HCM Control Delay (s)	8.8	-	12.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	26	29	502	520	50
Future Vol, veh/h	0	26	29	502	520	50
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	220	-	-	220
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	28	31	534	553	53

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	553	606	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	4.12	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	0	533	972	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	533	972	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	972	-	533	-	-
HCM Lane V/C Ratio	0.032	-	0.052	-	-
HCM Control Delay (s)	8.8	-	12.1	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	3.8
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	85	71	169	107
Demand Flow Rate, veh/h	87	72	172	109
Vehicles Circulating, veh/h	116	159	70	94
Vehicles Exiting, veh/h	87	83	133	137
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.6	3.6	4.0	3.6
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	87	72	172	109
Cap Entry Lane, veh/h	1226	1173	1285	1254
Entry HV Adj Factor	0.977	0.988	0.981	0.983
Flow Entry, veh/h	85	71	169	107
Cap Entry, veh/h	1198	1159	1261	1233
V/C Ratio	0.071	0.061	0.134	0.087
Control Delay, s/veh	3.6	3.6	4.0	3.6
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Intersection	
Int Delay, s/veh	3.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	44	20	9	41	16	38
Future Vol, veh/h	44	20	9	41	16	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	47	21	10	44	17	40

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	68	0	122	58
Stage 1	-	-	-	-	58	-
Stage 2	-	-	-	-	64	-
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	-	-	1533	-	873	1008
Stage 1	-	-	-	-	965	-
Stage 2	-	-	-	-	959	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1533	-	867	1008
Mov Cap-2 Maneuver	-	-	-	-	867	-
Stage 1	-	-	-	-	965	-
Stage 2	-	-	-	-	952	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	867	1008	-	-	1533	-
HCM Lane V/C Ratio	0.02	0.04	-	-	0.006	-
HCM Control Delay (s)	9.2	8.7	-	-	7.4	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	48	20	710	42	13	708
Future Vol, veh/h	48	20	710	42	13	708
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	-	-	0	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	21	755	45	14	753

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1160	378	0	0	800	0
Stage 1	755	-	-	-	-	-
Stage 2	405	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	189	620	-	-	819	-
Stage 1	425	-	-	-	-	-
Stage 2	642	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	186	620	-	-	819	-
Mov Cap-2 Maneuver	186	-	-	-	-	-
Stage 1	425	-	-	-	-	-
Stage 2	631	-	-	-	-	-

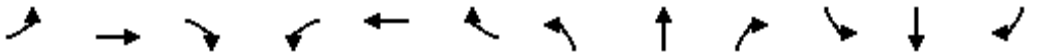
Approach	WB	NB	SB
HCM Control Delay, s	27.1	0	0.2
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	234	819	-
HCM Lane V/C Ratio	-	-	0.309	0.017	-
HCM Control Delay (s)	-	-	27.1	9.5	-
HCM Lane LOS	-	-	D	A	-
HCM 95th %tile Q(veh)	-	-	1.3	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	37	5	108	55	13	177	688	21	42	673	41
Future Volume (vph)	37	5	108	55	13	177	688	21	42	673	41
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	20.0	20.0	10.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0
Total Split (s)	12.0	30.0	30.0	12.0	30.0	12.0	66.0	66.0	12.0	66.0	66.0
Total Split (%)	10.0%	25.0%	25.0%	10.0%	25.0%	10.0%	55.0%	55.0%	10.0%	55.0%	55.0%
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)	12.4	7.1	7.1	13.6	9.4	70.6	66.5	66.5	67.5	61.2	61.2
Actuated g/C Ratio	0.12	0.07	0.07	0.14	0.09	0.71	0.67	0.67	0.68	0.61	0.61
v/c Ratio	0.20	0.04	0.53	0.29	0.23	0.37	0.31	0.02	0.09	0.33	0.04
Control Delay	36.9	44.2	17.8	38.8	25.4	6.9	9.0	0.0	5.1	10.5	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	36.9	44.2	17.8	38.8	25.4	6.9	9.0	0.0	5.1	10.5	0.1
LOS	D	D	B	D	C	A	A	A	A	B	A
Approach Delay		23.3			33.2		8.4			9.6	
Approach LOS		C			C		A			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 99.7	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 11.3	Intersection LOS: B
Intersection Capacity Utilization 50.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 21: CR 5 & Colliers Pkwy/Erie HS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	5	108	55	13	27	177	688	21	42	673	41
Future Volume (veh/h)	37	5	108	55	13	27	177	688	21	42	673	41
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	39	5	115	59	14	29	188	732	22	45	716	44
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	235	175	148	259	55	113	537	2244	1001	515	2160	963
Arrive On Green	0.03	0.09	0.09	0.04	0.10	0.10	0.06	0.63	0.63	0.04	0.61	0.61
Sat Flow, veh/h	1781	1870	1585	1781	543	1125	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	39	5	115	59	0	43	188	732	22	45	716	44
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1668	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	2.0	0.2	7.1	3.0	0.0	2.4	3.9	9.6	0.5	0.9	9.9	1.1
Cycle Q Clear(g_c), s	2.0	0.2	7.1	3.0	0.0	2.4	3.9	9.6	0.5	0.9	9.9	1.1
Prop In Lane	1.00		1.00	1.00		0.67	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	235	175	148	259	0	168	537	2244	1001	515	2160	963
V/C Ratio(X)	0.17	0.03	0.78	0.23	0.00	0.26	0.35	0.33	0.02	0.09	0.33	0.05
Avail Cap(c_a), veh/h	301	466	395	312	0	415	555	2244	1001	576	2160	963
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.2	41.4	44.5	39.0	0.0	41.7	6.9	8.6	6.9	6.8	9.7	7.9
Incr Delay (d2), s/veh	0.3	0.1	8.4	0.4	0.0	0.8	0.4	0.4	0.0	0.1	0.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.1	3.1	1.3	0.0	1.0	1.3	3.2	0.2	0.3	3.4	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.5	41.4	52.9	39.4	0.0	42.5	7.3	9.0	6.9	6.9	10.1	8.0
LnGrp LOS	D	D	D	D	A	D	A	A	A	A	B	A
Approach Vol, veh/h		159			102			942			805	
Approach Delay, s/veh		49.3			40.7			8.6			9.8	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	68.4	9.0	14.4	11.0	66.0	8.3	15.1
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	61.0	7.0	25.0	7.0	61.0	7.0	25.0
Max Q Clear Time (g_c+I1), s	2.9	11.6	5.0	9.1	5.9	11.9	4.0	4.4
Green Ext Time (p_c), s	0.0	5.3	0.0	0.3	0.1	5.3	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	13.9
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	29	14	0	3	0	913	195	18	852	10
Future Vol, veh/h	0	0	29	14	0	3	0	913	195	18	852	10
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	-	-	0	-	-	-	-	-	250	125	-	120
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	0	0	31	15	0	3	0	971	207	19	906	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	453	1462	1926	486	-	0	0	1178	0	0
Stage 1	-	-	-	971	971	-	-	-	-	-	-	-
Stage 2	-	-	-	491	955	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	7.54	6.54	6.94	-	-	-	4.14	-	-
Critical Hdwy Stg 1	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	3.52	4.02	3.32	-	-	-	2.22	-	-
Pot Cap-1 Maneuver	0	0	554	90	66	527	0	-	-	589	-	-
Stage 1	0	0	-	271	329	-	0	-	-	-	-	-
Stage 2	0	0	-	528	335	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	554	83	64	527	-	-	-	589	-	-
Mov Cap-2 Maneuver	-	-	-	83	64	-	-	-	-	-	-	-
Stage 1	-	-	-	271	329	-	-	-	-	-	-	-
Stage 2	-	-	-	483	324	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.9	50.4	0	0.2
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	554	97	589	-	-
HCM Lane V/C Ratio	-	-	0.056	0.186	0.033	-	-
HCM Control Delay (s)	-	-	11.9	50.4	11.3	-	-
HCM Lane LOS	-	-	B	F	B	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0.6	0.1	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	3	294	14	3	157
Future Vol, veh/h	10	3	294	14	3	157
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	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	3	313	15	3	167

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	494	321	0	0	328	0
Stage 1	321	-	-	-	-	-
Stage 2	173	-	-	-	-	-
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	535	720	-	-	1232	-
Stage 1	735	-	-	-	-	-
Stage 2	857	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	534	720	-	-	1232	-
Mov Cap-2 Maneuver	534	-	-	-	-	-
Stage 1	735	-	-	-	-	-
Stage 2	855	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.5	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	568	1232	-
HCM Lane V/C Ratio	-	-	0.024	0.003	-
HCM Control Delay (s)	-	-	11.5	7.9	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	37	32	0	0	49	296	43	0	290	4
Future Vol, veh/h	3	0	37	32	0	0	49	296	43	0	290	4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	39	34	0	0	52	315	46	0	309	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.4	9.2	12	10.6
HCM LOS	A	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	13%	7%	100%	0%
Vol Thru, %	76%	0%	0%	99%
Vol Right, %	11%	93%	0%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	388	40	32	294
LT Vol	49	3	32	0
Through Vol	296	0	0	290
RT Vol	43	37	0	4
Lane Flow Rate	413	43	34	313
Geometry Grp	1	1	1	1
Degree of Util (X)	0.508	0.059	0.055	0.396
Departure Headway (Hd)	4.433	5.032	5.789	4.563
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	813	707	615	788
Service Time	2.464	3.097	3.855	2.597
HCM Lane V/C Ratio	0.508	0.061	0.055	0.397
HCM Control Delay	12	8.4	9.2	10.6
HCM Lane LOS	B	A	A	B
HCM 95th-tile Q	2.9	0.2	0.2	1.9

Intersection	
Intersection Delay, s/veh	11.0
Intersection LOS	B

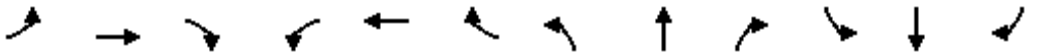
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	328	324	595	572
Demand Flow Rate, veh/h	334	331	606	583
Vehicles Circulating, veh/h	653	564	205	339
Vehicles Exiting, veh/h	269	247	782	556
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	12.0	10.3	9.8	12.2
Approach LOS	B	B	A	B

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	334	331	606	583
Cap Entry Lane, veh/h	709	776	1120	977
Entry HV Adj Factor	0.982	0.980	0.981	0.980
Flow Entry, veh/h	328	324	595	572
Cap Entry, veh/h	696	760	1098	957
V/C Ratio	0.471	0.426	0.541	0.597
Control Delay, s/veh	12.0	10.3	9.8	12.2
LOS	B	B	A	B
95th %tile Queue, veh	3	2	3	4

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	15	64	141	17	112	157	203	14	30	237	24
Future Volume (vph)	15	64	141	17	112	157	203	14	30	237	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	10.0	10.0	5.0	10.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	11.0	20.0	20.0	11.0	20.0	11.0	21.0	21.0	11.0	21.0	21.0
Total Split (s)	11.0	25.0	25.0	11.0	25.0	11.0	63.0	63.0	11.0	63.0	63.0
Total Split (%)	10.0%	22.7%	22.7%	10.0%	22.7%	10.0%	57.3%	57.3%	10.0%	57.3%	57.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	14.9	13.0	13.0	14.9	13.0	65.0	62.2	62.2	62.4	57.4	57.4
Actuated g/C Ratio	0.15	0.13	0.13	0.15	0.13	0.67	0.64	0.64	0.64	0.59	0.59
v/c Ratio	0.08	0.27	0.44	0.08	0.57	0.22	0.10	0.01	0.04	0.12	0.03
Control Delay	32.1	41.9	11.0	32.2	47.7	7.5	9.5	0.0	6.8	10.4	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	32.1	41.9	11.0	32.2	47.7	7.5	9.5	0.0	6.8	10.4	0.0
LOS	C	D	B	C	D	A	A	A	A	B	A
Approach Delay		21.4			46.0		8.3			9.2	
Approach LOS		C			D		A			A	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 97.6	
Natural Cycle: 65	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.57	
Intersection Signal Delay: 16.8	Intersection LOS: B
Intersection Capacity Utilization 48.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 4: CR 7 & CR 10



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	64	141	17	112	23	157	203	14	30	237	24
Future Volume (veh/h)	15	64	141	17	112	23	157	203	14	30	237	24
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	68	150	18	119	24	167	216	15	32	252	26
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	158	219	185	205	179	36	756	2107	940	776	2034	907
Arrive On Green	0.02	0.12	0.12	0.02	0.12	0.12	0.05	0.59	0.59	0.03	0.57	0.57
Sat Flow, veh/h	1781	1870	1585	1781	1511	305	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	16	68	150	18	0	143	167	216	15	32	252	26
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1816	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	0.8	3.3	9.2	0.9	0.0	7.5	3.9	2.6	0.4	0.7	3.3	0.7
Cycle Q Clear(g_c), s	0.8	3.3	9.2	0.9	0.0	7.5	3.9	2.6	0.4	0.7	3.3	0.7
Prop In Lane	1.00		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	158	219	185	205	0	215	756	2107	940	776	2034	907
V/C Ratio(X)	0.10	0.31	0.81	0.09	0.00	0.66	0.22	0.10	0.02	0.04	0.12	0.03
Avail Cap(c_a), veh/h	216	357	302	259	0	346	756	2107	940	813	2034	907
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.9	40.3	42.9	37.6	0.0	42.0	7.9	8.8	8.3	8.0	9.8	9.3
Incr Delay (d2), s/veh	0.3	0.8	8.2	0.2	0.0	3.5	0.1	0.1	0.0	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	1.5	3.9	0.4	0.0	3.4	1.3	0.9	0.1	0.2	1.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.2	41.1	51.1	37.7	0.0	45.5	8.0	8.9	8.4	8.1	9.9	9.3
LnGrp LOS	D	D	D	D	A	D	A	A	A	A	A	A
Approach Vol, veh/h		234			161			398			310	
Approach Delay, s/veh		47.3			44.6			8.5			9.7	
Approach LOS		D			D			A			A	

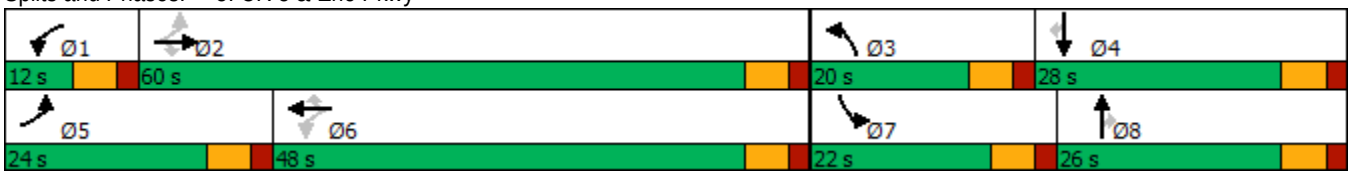
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	65.1	8.0	17.6	11.0	63.0	7.8	17.8
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	57.0	5.0	19.0	5.0	57.0	5.0	19.0
Max Q Clear Time (g_c+I1), s	2.7	4.6	2.9	11.2	5.9	5.3	2.8	9.5
Green Ext Time (p_c), s	0.0	1.4	0.0	0.4	0.0	1.6	0.0	0.4

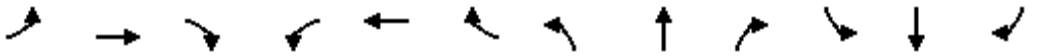
Intersection Summary	
HCM 6th Ctrl Delay	22.3
HCM 6th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	279	766	236	95	940	328	279	302	43	393	320	308
Future Volume (vph)	279	766	236	95	940	328	279	302	43	393	320	308
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	25.0	25.0	5.0	25.0	25.0	5.0	8.0	8.0	5.0	8.0	8.0
Minimum Split (s)	11.0	31.0	31.0	11.0	31.0	31.0	11.0	14.0	14.0	11.0	14.0	14.0
Total Split (s)	24.0	60.0	60.0	12.0	48.0	48.0	20.0	26.0	26.0	22.0	28.0	28.0
Total Split (%)	20.0%	50.0%	50.0%	10.0%	40.0%	40.0%	16.7%	21.7%	21.7%	18.3%	23.3%	23.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	-3.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	3.0	6.0	6.0	3.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	65.9	57.1	54.1	49.1	46.3	43.3	12.9	14.7	14.7	15.6	17.5	17.5
Actuated g/C Ratio	0.58	0.50	0.47	0.43	0.41	0.38	0.11	0.13	0.13	0.14	0.15	0.15
v/c Ratio	0.85	0.46	0.28	0.32	0.69	0.42	0.76	0.70	0.12	0.88	0.62	0.76
Control Delay	47.6	20.1	3.2	16.1	32.1	4.5	63.1	56.2	0.7	69.9	50.9	27.7
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	47.6	20.1	3.2	16.1	32.1	4.5	63.1	56.2	0.7	69.9	50.9	27.7
LOS	D	C	A	B	C	A	E	E	A	E	D	C
Approach Delay		23.0			24.4			55.5			51.2	
Approach LOS		C			C			E			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 114.3	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 34.9	Intersection LOS: C
Intersection Capacity Utilization 79.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 5: CR 5 & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	279	766	236	95	940	328	279	302	43	393	320	308
Future Volume (veh/h)	279	766	236	95	940	328	279	302	43	393	320	308
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	294	806	248	100	989	345	294	318	45	414	337	324
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	332	1722	728	312	1493	625	351	547	244	466	665	296
Arrive On Green	0.11	0.48	0.46	0.05	0.42	0.39	0.10	0.15	0.15	0.13	0.19	0.19
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	3554	1585	3456	3554	1585
Grp Volume(v), veh/h	294	806	248	100	989	345	294	318	45	414	337	324
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1777	1585	1728	1777	1585
Q Serve(g_s), s	11.1	17.8	11.8	3.9	26.3	19.8	9.8	9.8	2.9	13.9	10.0	22.0
Cycle Q Clear(g_c), s	11.1	17.8	11.8	3.9	26.3	19.8	9.8	9.8	2.9	13.9	10.0	22.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	332	1722	728	312	1493	625	351	547	244	466	665	296
V/C Ratio(X)	0.89	0.47	0.34	0.32	0.66	0.55	0.84	0.58	0.18	0.89	0.51	1.09
Avail Cap(c_a), veh/h	404	1722	728	317	1493	625	411	604	269	470	665	296
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.5	20.2	20.4	19.9	27.4	27.6	51.9	46.3	43.3	50.0	42.9	47.8
Incr Delay (d2), s/veh	16.0	0.9	1.3	0.2	2.3	3.5	10.9	0.6	0.1	17.7	0.3	79.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	7.0	4.5	1.5	10.9	7.9	4.7	4.3	1.1	7.1	4.4	15.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.5	21.1	21.7	20.1	29.7	31.0	62.7	46.8	43.5	67.7	43.2	127.3
LnGrp LOS	D	C	C	C	C	C	E	D	D	E	D	F
Approach Vol, veh/h		1348			1434			657			1075	
Approach Delay, s/veh		25.2			29.4			53.7			78.0	
Approach LOS		C			C			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.7	60.0	18.0	28.0	19.3	52.4	21.9	24.1
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	54.0	14.0	22.0	18.0	42.0	16.0	20.0
Max Q Clear Time (g_c+I1), s	5.9	19.8	11.8	24.0	13.1	28.3	15.9	11.8
Green Ext Time (p_c), s	0.0	10.0	0.1	0.0	0.2	8.2	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	43.3
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1179	23	45	1362	1	102
Future Vol, veh/h	1179	23	45	1362	1	102
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	220	110	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1254	24	48	1449	1	109

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1278	0	2075	627
Stage 1	-	-	-	-	1254	-
Stage 2	-	-	-	-	821	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	539	-	46	426
Stage 1	-	-	-	-	232	-
Stage 2	-	-	-	-	393	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	539	-	42	426
Mov Cap-2 Maneuver	-	-	-	-	42	-
Stage 1	-	-	-	-	232	-
Stage 2	-	-	-	-	358	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	16.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	426	-	-	539	-
HCM Lane V/C Ratio	0.255	-	-	0.089	-
HCM Control Delay (s)	16.3	-	-	12.3	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	1	-	-	0.3	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1133	148	28	1181	226	179
Future Volume (vph)	1133	148	28	1181	226	179
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	3	
Permitted Phases		2	6			3
Detector Phase	2	2	1	6	3	3
Switch Phase						
Minimum Initial (s)	25.0	25.0	5.0	25.0	5.0	5.0
Minimum Split (s)	31.0	31.0	11.0	31.0	11.0	11.0
Total Split (s)	69.0	69.0	11.0	80.0	30.0	30.0
Total Split (%)	62.7%	62.7%	10.0%	72.7%	27.3%	27.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	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
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Max	Max	None	Max	None	None
Act Effct Green (s)	67.7	67.7	74.1	74.1	18.7	18.7
Actuated g/C Ratio	0.65	0.65	0.71	0.71	0.18	0.18
v/c Ratio	0.53	0.15	0.10	0.50	0.76	0.48
Control Delay	12.6	2.0	6.3	8.3	56.7	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	2.0	6.3	8.3	56.7	15.6
LOS	B	A	A	A	E	B
Approach Delay	11.4			8.3	38.6	
Approach LOS	B			A	D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 104.9	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 13.9	Intersection LOS: B
Intersection Capacity Utilization 55.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 7: Waterford St & Erie Pkwy

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1133	148	28	1181	226	179
Future Volume (veh/h)	1133	148	28	1181	226	179
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1205	157	30	1256	240	190
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2261	1009	300	2569	284	253
Arrive On Green	0.64	0.64	0.03	0.72	0.16	0.16
Sat Flow, veh/h	3647	1585	1781	3647	1781	1585
Grp Volume(v), veh/h	1205	157	30	1256	240	190
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1781	1585
Q Serve(g_s), s	19.1	4.1	0.6	15.5	13.4	11.7
Cycle Q Clear(g_c), s	19.1	4.1	0.6	15.5	13.4	11.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2261	1009	300	2569	284	253
V/C Ratio(X)	0.53	0.16	0.10	0.49	0.84	0.75
Avail Cap(c_a), veh/h	2261	1009	337	2569	418	372
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.2	7.5	7.5	6.1	41.8	41.1
Incr Delay (d2), s/veh	0.9	0.3	0.1	0.7	10.0	4.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	1.4	0.2	4.2	6.6	4.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.1	7.8	7.7	6.7	51.7	45.8
LnGrp LOS	B	A	A	A	D	D
Approach Vol, veh/h	1362			1286	430	
Approach Delay, s/veh	10.8			6.8	49.1	
Approach LOS	B			A	D	

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	8.9	71.1				80.0	22.3
Change Period (Y+Rc), s	6.0	6.0				6.0	6.0
Max Green Setting (Gmax), s	5.0	63.0				74.0	24.0
Max Q Clear Time (g_c+I1), s	2.6	21.1				17.5	15.4
Green Ext Time (p_c), s	0.0	10.8				11.1	1.0

Intersection Summary							
HCM 6th Ctrl Delay			14.4				
HCM 6th LOS			B				

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1241	71	51	1166	43	62
Future Volume (vph)	1241	71	51	1166	43	62
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	3	
Permitted Phases		2	6		3	3
Detector Phase	2	2	1	6	3	3
Switch Phase						
Minimum Initial (s)	25.0	25.0	5.0	25.0	5.0	5.0
Minimum Split (s)	31.0	31.0	11.0	31.0	11.0	11.0
Total Split (s)	64.0	64.0	11.0	75.0	35.0	35.0
Total Split (%)	58.2%	58.2%	10.0%	68.2%	31.8%	31.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	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
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Max	Max	None	Max	None	None
Act Effct Green (s)	64.4	64.4	72.0	73.2	7.8	7.8
Actuated g/C Ratio	0.72	0.72	0.80	0.82	0.09	0.09
v/c Ratio	0.52	0.07	0.17	0.43	0.30	0.34
Control Delay	8.6	1.8	3.7	3.7	43.0	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	1.8	3.7	3.7	43.0	15.0
LOS	A	A	A	A	D	B
Approach Delay	8.2			3.7	26.5	
Approach LOS	A			A	C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 89.5	
Natural Cycle: 55	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.52	
Intersection Signal Delay: 6.9	Intersection LOS: A
Intersection Capacity Utilization 56.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 8: Future Access & Erie Pkwy

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1241	71	51	1166	43	62
Future Volume (veh/h)	1241	71	51	1166	43	62
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1320	76	54	1240	46	66
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2441	1089	367	2838	112	99
Arrive On Green	0.69	0.69	0.04	0.80	0.06	0.06
Sat Flow, veh/h	3647	1585	1781	3647	1781	1585
Grp Volume(v), veh/h	1320	76	54	1240	46	66
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1781	1585
Q Serve(g_s), s	16.0	1.4	0.7	9.3	2.1	3.5
Cycle Q Clear(g_c), s	16.0	1.4	0.7	9.3	2.1	3.5
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2441	1089	367	2838	112	99
V/C Ratio(X)	0.54	0.07	0.15	0.44	0.41	0.66
Avail Cap(c_a), veh/h	2441	1089	395	2838	598	532
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.7	4.4	4.9	2.7	39.0	39.6
Incr Delay (d2), s/veh	0.9	0.1	0.2	0.5	2.4	7.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.4	0.1	1.2	1.0	1.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.6	4.6	5.1	3.2	41.4	47.0
LnGrp LOS	A	A	A	A	D	D
Approach Vol, veh/h	1396			1294	112	
Approach Delay, s/veh	7.4			3.3	44.7	
Approach LOS	A			A	D	

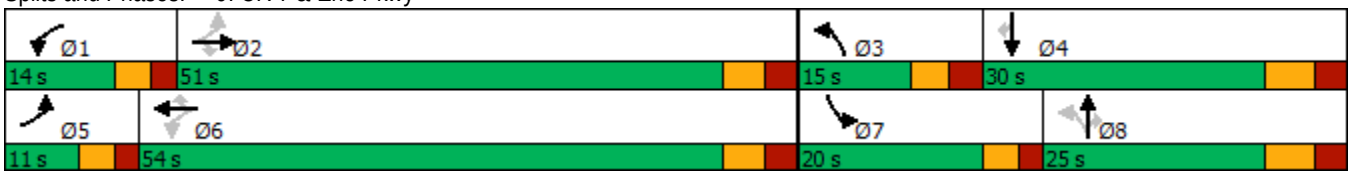
Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	9.6	65.4				75.0	11.4
Change Period (Y+Rc), s	6.0	6.0				6.0	6.0
Max Green Setting (Gmax), s	5.0	58.0				69.0	29.0
Max Q Clear Time (g_c+I1), s	2.7	18.0				11.3	5.5
Green Ext Time (p_c), s	0.0	11.8				10.9	0.3

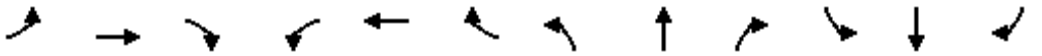
Intersection Summary	
HCM 6th Ctrl Delay	7.0
HCM 6th LOS	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	157	1092	54	153	887	175	147	183	26	208	216	183
Future Volume (vph)	157	1092	54	153	887	175	147	183	26	208	216	183
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.0	16.3	16.3	10.0	16.3	16.3	10.8	16.8	16.8	10.0	16.8	16.8
Total Split (s)	11.0	51.0	51.0	14.0	54.0	54.0	15.0	25.0	25.0	20.0	30.0	30.0
Total Split (%)	10.0%	46.4%	46.4%	12.7%	49.1%	49.1%	13.6%	22.7%	22.7%	18.2%	27.3%	27.3%
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.5	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	2.8	2.8	2.8	2.0	2.8	2.8
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	6.3	6.3	5.0	6.3	6.3	5.8	6.8	6.8	5.0	6.8	6.8
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)	52.4	45.1	45.1	57.8	47.8	47.8	21.4	11.4	11.4	11.7	13.3	13.3
Actuated g/C Ratio	0.52	0.45	0.45	0.58	0.48	0.48	0.21	0.11	0.11	0.12	0.13	0.13
v/c Ratio	0.55	0.73	0.07	0.62	0.56	0.22	0.52	0.48	0.09	0.55	0.49	0.51
Control Delay	18.1	26.4	0.2	22.8	20.7	3.2	35.0	46.1	0.6	47.4	43.6	10.8
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	18.1	26.4	0.2	22.8	20.7	3.2	35.0	46.1	0.6	47.4	43.6	10.8
LOS	B	C	A	C	C	A	C	D	A	D	D	B
Approach Delay		24.3			18.4			38.2			35.0	
Approach LOS		C			B			D			C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 100	
Natural Cycle: 70	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 25.6	Intersection LOS: C
Intersection Capacity Utilization 75.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 9: CR 7 & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	157	1092	54	153	887	175	147	183	26	208	216	183
Future Volume (veh/h)	157	1092	54	153	887	175	147	183	26	208	216	183
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	167	1162	57	163	944	186	156	195	28	221	230	195
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	311	1626	725	279	1657	739	320	582	259	295	538	240
Arrive On Green	0.06	0.46	0.46	0.07	0.47	0.47	0.09	0.16	0.16	0.09	0.15	0.15
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	3554	1585	3456	3554	1585
Grp Volume(v), veh/h	167	1162	57	163	944	186	156	195	28	221	230	195
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1777	1585	1728	1777	1585
Q Serve(g_s), s	5.1	27.0	2.1	4.9	19.7	7.3	7.4	5.0	1.5	6.4	6.0	12.2
Cycle Q Clear(g_c), s	5.1	27.0	2.1	4.9	19.7	7.3	7.4	5.0	1.5	6.4	6.0	12.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	311	1626	725	279	1657	739	320	582	259	295	538	240
V/C Ratio(X)	0.54	0.71	0.08	0.58	0.57	0.25	0.49	0.34	0.11	0.75	0.43	0.81
Avail Cap(c_a), veh/h	311	1626	725	316	1657	739	320	632	282	507	806	360
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.8	22.4	15.6	18.2	19.8	16.5	32.5	37.8	36.4	45.7	39.4	42.0
Incr Delay (d2), s/veh	1.8	2.7	0.2	2.2	1.4	0.8	1.2	0.3	0.2	3.8	0.5	8.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	10.6	0.7	1.9	7.6	2.6	3.2	2.1	0.6	2.8	2.6	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.6	25.1	15.8	20.4	21.3	17.3	33.6	38.2	36.6	49.5	39.9	50.4
LnGrp LOS	B	C	B	C	C	B	C	D	D	D	D	D
Approach Vol, veh/h		1386			1293			379			646	
Approach Delay, s/veh		23.8			20.6			36.2			46.3	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.9	53.1	15.0	22.3	11.0	54.0	13.7	23.5
Change Period (Y+Rc), s	5.0	* 6.3	* 5.8	* 6.8	5.0	* 6.3	5.0	* 6.8
Max Green Setting (Gmax), s	9.0	* 45	* 9.2	* 23	6.0	* 48	15.0	* 18
Max Q Clear Time (g_c+I1), s	6.9	29.0	9.4	14.2	7.1	21.7	8.4	7.0
Green Ext Time (p_c), s	0.1	6.9	0.0	1.3	0.0	7.1	0.4	0.8

Intersection Summary	
HCM 6th Ctrl Delay	27.9
HCM 6th LOS	C

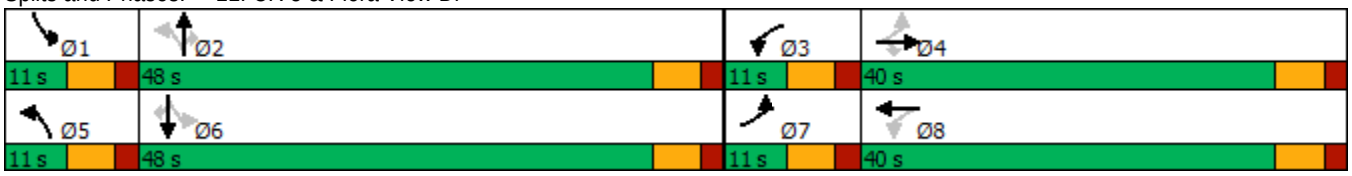
Notes

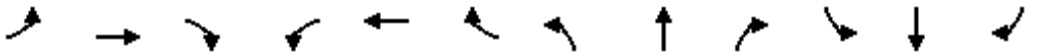
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	20	108	175	83	63	118	374	127	145	520	14
Future Volume (vph)	20	108	175	83	63	118	374	127	145	520	14
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	10.0	10.0	5.0	10.0	5.0	25.0	25.0	5.0	25.0	25.0
Minimum Split (s)	11.0	40.0	40.0	11.0	40.0	11.0	36.0	36.0	11.0	36.0	36.0
Total Split (s)	11.0	40.0	40.0	11.0	40.0	11.0	48.0	48.0	11.0	48.0	48.0
Total Split (%)	10.0%	36.4%	36.4%	10.0%	36.4%	10.0%	43.6%	43.6%	10.0%	43.6%	43.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	16.3	12.4	12.4	18.7	16.8	47.3	42.2	42.2	47.3	42.2	42.2
Actuated g/C Ratio	0.19	0.14	0.14	0.22	0.19	0.55	0.49	0.49	0.55	0.49	0.49
v/c Ratio	0.09	0.43	0.48	0.31	0.52	0.34	0.44	0.16	0.31	0.61	0.02
Control Delay	24.6	39.6	9.8	28.7	22.0	11.3	17.5	2.7	10.6	20.9	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	24.6	39.6	9.8	28.7	22.0	11.3	17.5	2.7	10.6	20.9	0.1
LOS	C	D	A	C	C	B	B	A	B	C	A
Approach Delay		21.4			24.0		13.3			18.3	
Approach LOS		C			C		B			B	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 86.3	
Natural Cycle: 100	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 18.0	Intersection LOS: B
Intersection Capacity Utilization 65.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 11: CR 5 & Flora View Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	108	175	83	63	137	118	374	127	145	520	14
Future Volume (veh/h)	20	108	175	83	63	137	118	374	127	145	520	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	21	115	186	88	67	146	126	398	135	154	553	15
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	279	236	281	95	208	389	880	745	465	880	746
Arrive On Green	0.02	0.15	0.15	0.06	0.18	0.18	0.06	0.47	0.47	0.06	0.47	0.47
Sat Flow, veh/h	1781	1870	1585	1781	524	1141	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	21	115	186	88	0	213	126	398	135	154	553	15
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1665	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.9	5.0	10.1	3.7	0.0	10.7	3.2	12.8	4.4	4.0	19.9	0.5
Cycle Q Clear(g_c), s	0.9	5.0	10.1	3.7	0.0	10.7	3.2	12.8	4.4	4.0	19.9	0.5
Prop In Lane	1.00		1.00	1.00		0.69	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	194	279	236	281	0	304	389	880	745	465	880	746
V/C Ratio(X)	0.11	0.41	0.79	0.31	0.00	0.70	0.32	0.45	0.18	0.33	0.63	0.02
Avail Cap(c_a), veh/h	253	712	603	281	0	634	389	880	745	465	880	746
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.3	34.5	36.6	29.8	0.0	34.2	13.4	15.9	13.7	12.1	17.8	12.6
Incr Delay (d2), s/veh	0.2	1.0	5.7	0.6	0.0	2.9	0.5	1.7	0.5	0.4	3.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	2.3	4.2	1.6	0.0	4.5	1.2	5.5	1.6	1.5	8.7	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.6	35.4	42.4	30.5	0.0	37.2	13.9	17.6	14.2	12.5	21.2	12.7
LnGrp LOS	C	D	D	C	A	D	B	B	B	B	C	B
Approach Vol, veh/h		322			301			659			722	
Approach Delay, s/veh		39.2			35.2			16.2			19.2	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	48.0	11.0	19.3	11.0	48.0	8.0	22.3
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	42.0	5.0	34.0	5.0	42.0	5.0	34.0
Max Q Clear Time (g_c+I1), s	6.0	14.8	5.7	12.1	5.2	21.9	2.9	12.7
Green Ext Time (p_c), s	0.0	2.9	0.0	1.2	0.0	3.5	0.0	1.2

Intersection Summary	
HCM 6th Ctrl Delay	23.8
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	1	372	389	2
Future Vol, veh/h	0	0	1	372	389	2
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	-	220	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	1	396	414	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	615	208	416	0	-	0
Stage 1	415	-	-	-	-	-
Stage 2	200	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	423	798	1139	-	-	-
Stage 1	635	-	-	-	-	-
Stage 2	814	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	423	798	1139	-	-	-
Mov Cap-2 Maneuver	423	-	-	-	-	-
Stage 1	634	-	-	-	-	-
Stage 2	814	-	-	-	-	-

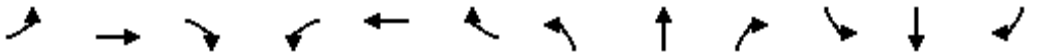
Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1139	-	-	-	-
HCM Lane V/C Ratio	0.001	-	-	-	-
HCM Control Delay (s)	8.2	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Lane Group	EBT	WBL	WBT	NBT	NBR	SBL	SBT	Ø5	Ø7
Lane Configurations									
Traffic Volume (vph)	75	255	125	311	204	30	352		
Future Volume (vph)	75	255	125	311	204	30	352		
Turn Type	NA	pm+pt	NA	NA	Perm	pm+pt	NA		
Protected Phases	4	3	8	2		1	6	5	7
Permitted Phases		8			2	6			
Detector Phase	4	3	8	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
Minimum Split (s)	20.0	10.0	20.0	20.0	20.0	10.0	20.0	10.0	10.0
Total Split (s)	25.0	20.0	26.0	54.0	54.0	11.0	54.0	11.0	19.0
Total Split (%)	22.7%	18.2%	23.6%	49.1%	49.1%	10.0%	49.1%	10%	17%
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		
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Lead/Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	13.9	31.3	15.4	49.1	49.1	55.1	49.1		
Actuated g/C Ratio	0.13	0.30	0.15	0.47	0.47	0.53	0.47		
v/c Ratio	0.32	0.63	0.70	0.20	0.25	0.06	0.23		
Control Delay	43.7	35.3	52.1	17.2	3.2	11.2	17.5		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	43.7	35.3	52.1	17.2	3.2	11.2	17.5		
LOS	D	D	D	B	A	B	B		
Approach Delay	43.7		42.3	11.7			17.0		
Approach LOS	D		D	B			B		

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 104.5	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 24.3	Intersection LOS: C
Intersection Capacity Utilization 47.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 13: CR 7 & Flora View Dr



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	75	0	255	125	58	0	311	204	30	352	0
Future Volume (veh/h)	0	75	0	255	125	58	0	311	204	30	352	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	80	0	271	133	62	0	331	217	32	374	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	343	230	0	441	160	75	594	1697	757	538	1697	757
Arrive On Green	0.00	0.12	0.00	0.15	0.13	0.13	0.00	0.48	0.48	0.06	0.48	0.00
Sat Flow, veh/h	1781	1870	0	1781	1207	562	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	0	80	0	271	0	195	0	331	217	32	374	0
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	0	1769	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	0.0	4.0	0.0	13.5	0.0	11.0	0.0	5.5	8.5	0.9	6.3	0.0
Cycle Q Clear(g_c), s	0.0	4.0	0.0	13.5	0.0	11.0	0.0	5.5	8.5	0.9	6.3	0.0
Prop In Lane	1.00		0.00	1.00		0.32	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	343	230	0	441	0	235	594	1697	757	538	1697	757
V/C Ratio(X)	0.00	0.35	0.00	0.61	0.00	0.83	0.00	0.20	0.29	0.06	0.22	0.00
Avail Cap(c_a), veh/h	343	364	0	441	0	362	594	1697	757	538	1697	757
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	41.2	0.0	32.4	0.0	43.4	0.0	15.5	16.2	11.4	15.7	0.0
Incr Delay (d2), s/veh	0.0	0.9	0.0	6.3	0.0	9.2	0.0	0.3	1.0	0.2	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.9	0.0	6.5	0.0	5.4	0.0	2.1	3.2	0.3	2.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	42.1	0.0	38.7	0.0	52.6	0.0	15.7	17.2	11.6	16.0	0.0
LnGrp LOS	A	D	A	D	A	D	A	B	B	B	B	A
Approach Vol, veh/h		80			466			548			406	
Approach Delay, s/veh		42.1			44.5			16.3			15.6	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	54.0	20.0	17.6	11.0	54.0	19.0	18.6
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	6.0	49.0	15.0	20.0	6.0	49.0	14.0	21.0
Max Q Clear Time (g_c+I1), s	2.9	10.5	15.5	6.0	0.0	8.3	0.0	13.0
Green Ext Time (p_c), s	0.0	2.8	0.0	0.3	0.0	2.4	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	26.3
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	6	613	46	43	735
Future Vol, veh/h	4	6	613	46	43	735
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	-	-	0	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	7	748	56	52	896

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1300	374	0	0	804	0
Stage 1	748	-	-	-	-	-
Stage 2	552	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	153	623	-	-	816	-
Stage 1	429	-	-	-	-	-
Stage 2	541	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	143	623	-	-	816	-
Mov Cap-2 Maneuver	143	-	-	-	-	-
Stage 1	429	-	-	-	-	-
Stage 2	506	-	-	-	-	-

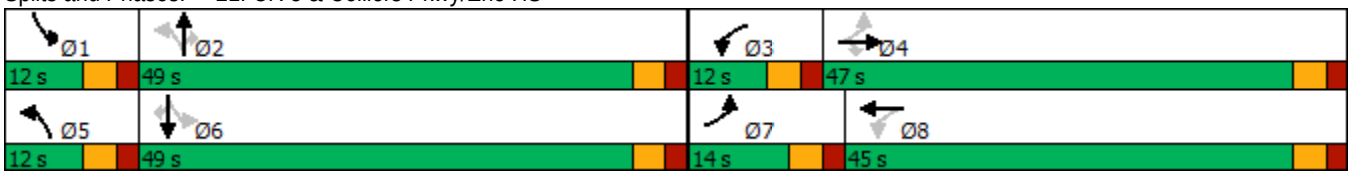
Approach	WB	NB	SB
HCM Control Delay, s	19.2	0	0.5
HCM LOS	C		

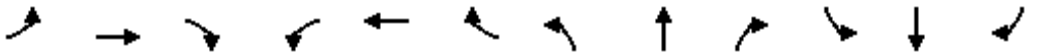
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	266	816	-
HCM Lane V/C Ratio	-	-	0.046	0.064	-
HCM Control Delay (s)	-	-	19.2	9.7	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	199	131	258	222	67	87	370	112	129	570	40
Future Volume (vph)	199	131	258	222	67	87	370	112	129	570	40
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	20.0	20.0	10.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0
Total Split (s)	14.0	47.0	47.0	12.0	45.0	12.0	49.0	49.0	12.0	49.0	49.0
Total Split (%)	11.7%	39.2%	39.2%	10.0%	37.5%	10.0%	40.8%	40.8%	10.0%	40.8%	40.8%
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	Max	Max	None	Max	Max
Act Effct Green (s)	28.9	19.9	19.9	24.9	17.8	51.1	44.3	44.3	51.4	44.4	44.4
Actuated g/C Ratio	0.29	0.20	0.20	0.25	0.18	0.52	0.45	0.45	0.52	0.45	0.45
v/c Ratio	1.00	0.51	0.81	1.02	0.66	0.38	0.34	0.21	0.42	0.52	0.08
Control Delay	84.7	38.9	31.2	89.0	36.1	15.1	19.5	4.0	15.4	22.0	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	84.7	38.9	31.2	89.0	36.1	15.1	19.5	4.0	15.4	22.0	0.6
LOS	F	D	C	F	D	B	B	A	B	C	A
Approach Delay		51.0			67.1		15.8			19.7	
Approach LOS		D			E		B			B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 98.3	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 34.7	Intersection LOS: C
Intersection Capacity Utilization 60.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 21: CR 5 & Colliers Pkwy/Erie HS





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	199	131	258	222	67	90	87	370	112	129	570	40
Future Volume (veh/h)	199	131	258	222	67	90	87	370	112	129	570	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		0.91	0.93		0.91	0.98		0.98	0.99		0.90
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	288	190	374	322	97	130	126	536	162	187	826	58
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	376	540	414	411	185	248	316	1426	622	433	1446	582
Arrive On Green	0.08	0.29	0.29	0.06	0.27	0.27	0.06	0.40	0.40	0.06	0.41	0.41
Sat Flow, veh/h	1781	1870	1435	1781	684	917	1781	3554	1551	1781	3554	1431
Grp Volume(v), veh/h	288	190	374	322	0	227	126	536	162	187	826	58
Grp Sat Flow(s),veh/h/ln	1781	1870	1435	1781	0	1601	1781	1777	1551	1781	1777	1431
Q Serve(g_s), s	9.0	8.8	27.5	7.0	0.0	13.2	4.5	11.7	7.7	6.9	19.7	2.7
Cycle Q Clear(g_c), s	9.0	8.8	27.5	7.0	0.0	13.2	4.5	11.7	7.7	6.9	19.7	2.7
Prop In Lane	1.00		1.00	1.00		0.57	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	376	540	414	411	0	433	316	1426	622	433	1446	582
V/C Ratio(X)	0.77	0.35	0.90	0.78	0.00	0.52	0.40	0.38	0.26	0.43	0.57	0.10
Avail Cap(c_a), veh/h	376	716	550	411	0	584	326	1426	622	433	1446	582
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.9	30.9	37.5	35.0	0.0	34.0	19.3	23.2	22.0	18.3	25.1	20.1
Incr Delay (d2), s/veh	9.1	0.4	15.0	9.5	0.0	1.0	0.8	0.8	1.0	0.7	1.6	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	4.0	11.2	5.8	0.0	5.2	1.8	4.8	3.0	2.7	8.1	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.0	31.3	52.5	44.6	0.0	35.0	20.1	23.9	23.0	19.0	26.8	20.5
LnGrp LOS	D	C	D	D	A	C	C	C	C	B	C	C
Approach Vol, veh/h		852			549			824			1071	
Approach Delay, s/veh		44.2			40.6			23.1			25.1	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	49.0	12.0	36.7	11.4	49.6	14.0	34.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	44.0	7.0	42.0	7.0	44.0	9.0	40.0
Max Q Clear Time (g_c+I1), s	8.9	13.7	9.0	29.5	6.5	21.7	11.0	15.2
Green Ext Time (p_c), s	0.0	4.0	0.0	2.2	0.0	5.6	0.0	1.5

Intersection Summary	
HCM 6th Ctrl Delay	32.1
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	49	3	0	38	0	575	334	101	969	3
Future Vol, veh/h	0	0	49	3	0	38	0	575	334	101	969	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	-	-	0	-	-	-	-	-	250	125	-	120
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	68	68	68	68	68	68	68	68	68	68	68	68
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	72	4	0	56	0	846	491	149	1425	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	713	1857	2573	423	-	0	0	1337	0	0
Stage 1	-	-	-	846	846	-	-	-	-	-	-	-
Stage 2	-	-	-	1011	1727	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	7.54	6.54	6.94	-	-	-	4.14	-	-
Critical Hdwy Stg 1	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	3.52	4.02	3.32	-	-	-	2.22	-	-
Pot Cap-1 Maneuver	0	0	374	45	25	579	0	-	-	512	-	-
Stage 1	0	0	-	323	377	-	0	-	-	-	-	-
Stage 2	0	0	-	257	142	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	374	28	18	579	-	-	-	512	-	-
Mov Cap-2 Maneuver	-	-	-	28	18	-	-	-	-	-	-	-
Stage 1	-	-	-	323	377	-	-	-	-	-	-	-
Stage 2	-	-	-	147	101	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.9	25.3	0	1.4
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	374	237	512	-	-
HCM Lane V/C Ratio	-	-	0.193	0.254	0.29	-	-
HCM Control Delay (s)	-	-	16.9	25.3	14.9	-	-
HCM Lane LOS	-	-	C	D	B	-	-
HCM 95th %tile Q(veh)	-	-	0.7	1	1.2	-	-

Intersection	
Intersection Delay, s/veh	16.8
Intersection LOS	C

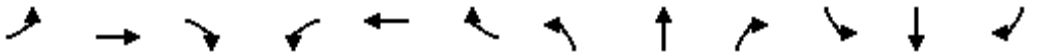
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	275	257	765	724
Demand Flow Rate, veh/h	280	262	780	739
Vehicles Circulating, veh/h	769	719	306	342
Vehicles Exiting, veh/h	312	367	743	639
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	12.6	11.1	18.6	18.4
Approach LOS	B	B	C	C

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	280	262	780	739
Cap Entry Lane, veh/h	630	663	1010	974
Entry HV Adj Factor	0.982	0.981	0.980	0.979
Flow Entry, veh/h	275	257	765	724
Cap Entry, veh/h	618	650	990	953
V/C Ratio	0.445	0.395	0.772	0.759
Control Delay, s/veh	12.6	11.1	18.6	18.4
LOS	B	B	C	C
95th %tile Queue, veh	2	2	8	7

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	26	85	215	28	82	137	318	23	34	486	20
Future Volume (vph)	26	85	215	28	82	137	318	23	34	486	20
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	10.0	10.0	5.0	10.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	11.0	20.0	20.0	11.0	20.0	11.0	21.0	21.0	11.0	21.0	21.0
Total Split (s)	11.0	25.0	25.0	11.0	25.0	11.0	63.0	63.0	11.0	63.0	63.0
Total Split (%)	10.0%	22.7%	22.7%	10.0%	22.7%	10.0%	57.3%	57.3%	10.0%	57.3%	57.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	15.3	12.5	12.5	15.3	12.5	65.0	62.2	62.2	62.4	57.3	57.3
Actuated g/C Ratio	0.15	0.13	0.13	0.15	0.13	0.66	0.63	0.63	0.63	0.58	0.58
v/c Ratio	0.14	0.38	0.57	0.13	0.55	0.25	0.15	0.02	0.05	0.25	0.02
Control Delay	32.9	45.8	11.7	32.8	44.3	8.1	10.1	0.0	7.1	11.8	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	32.9	45.8	11.7	32.8	44.3	8.1	10.1	0.0	7.1	11.8	0.1
LOS	C	D	B	C	D	A	B	A	A	B	A
Approach Delay		22.3			42.1		9.1			11.1	
Approach LOS		C			D		A			B	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 99.2	
Natural Cycle: 65	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.57	
Intersection Signal Delay: 16.0	Intersection LOS: B
Intersection Capacity Utilization 53.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 4: CR 7 & CR 10



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	85	215	28	82	42	137	318	23	34	486	20
Future Volume (veh/h)	26	85	215	28	82	42	137	318	23	34	486	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	28	90	229	30	87	45	146	338	24	36	517	21
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	236	304	258	245	190	98	549	1965	877	639	1907	851
Arrive On Green	0.03	0.16	0.16	0.03	0.16	0.16	0.05	0.55	0.55	0.03	0.54	0.54
Sat Flow, veh/h	1781	1870	1585	1781	1161	601	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	28	90	229	30	0	132	146	338	24	36	517	21
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1762	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	1.4	4.5	15.0	1.5	0.0	7.2	3.9	5.0	0.7	0.9	8.4	0.7
Cycle Q Clear(g_c), s	1.4	4.5	15.0	1.5	0.0	7.2	3.9	5.0	0.7	0.9	8.4	0.7
Prop In Lane	1.00		1.00	1.00		0.34	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	236	304	258	245	0	289	549	1965	877	639	1907	851
V/C Ratio(X)	0.12	0.30	0.89	0.12	0.00	0.46	0.27	0.17	0.03	0.06	0.27	0.02
Avail Cap(c_a), veh/h	272	335	284	279	0	315	549	1965	877	668	1907	851
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.7	39.1	43.5	35.5	0.0	40.1	10.4	11.7	10.8	10.2	13.3	11.6
Incr Delay (d2), s/veh	0.2	0.5	25.7	0.2	0.0	1.1	0.3	0.2	0.1	0.0	0.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	2.0	7.7	0.7	0.0	3.2	1.4	1.8	0.3	0.4	3.4	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.9	39.7	69.3	35.7	0.0	41.3	10.7	11.9	10.8	10.2	13.7	11.6
LnGrp LOS	D	D	E	D	A	D	B	B	B	B	B	B
Approach Vol, veh/h		347			162			508			574	
Approach Delay, s/veh		58.9			40.2			11.5			13.4	
Approach LOS		E			D			B			B	

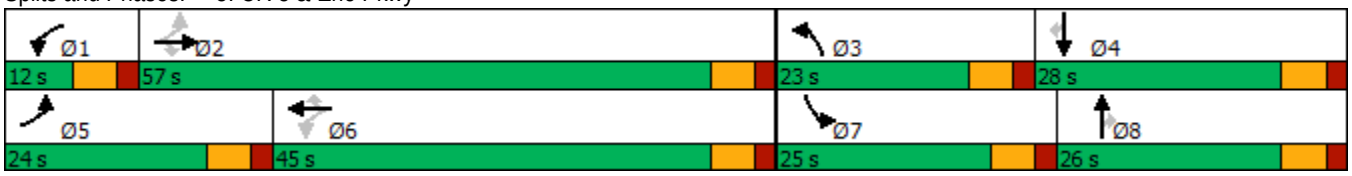
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.3	64.7	8.9	23.3	11.0	63.0	8.8	23.4
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	57.0	5.0	19.0	5.0	57.0	5.0	19.0
Max Q Clear Time (g_c+I1), s	2.9	7.0	3.5	17.0	5.9	10.4	3.4	9.2
Green Ext Time (p_c), s	0.0	2.2	0.0	0.2	0.0	4.0	0.0	0.4

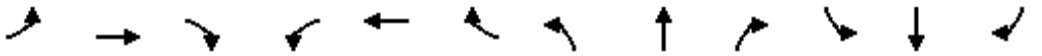
Intersection Summary	
HCM 6th Ctrl Delay	25.4
HCM 6th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	247	1256	399	43	781	464	322	383	95	398	280	174
Future Volume (vph)	247	1256	399	43	781	464	322	383	95	398	280	174
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	25.0	25.0	5.0	25.0	25.0	5.0	8.0	8.0	5.0	8.0	8.0
Minimum Split (s)	11.0	31.0	31.0	11.0	31.0	31.0	11.0	14.0	14.0	11.0	14.0	14.0
Total Split (s)	24.0	57.0	57.0	12.0	45.0	45.0	23.0	26.0	26.0	25.0	28.0	28.0
Total Split (%)	20.0%	47.5%	47.5%	10.0%	37.5%	37.5%	19.2%	21.7%	21.7%	20.8%	23.3%	23.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	-3.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	3.0	6.0	6.0	3.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	61.1	55.1	52.0	46.8	44.2	41.2	14.6	16.6	16.6	16.8	18.8	18.8
Actuated g/C Ratio	0.54	0.49	0.46	0.42	0.39	0.37	0.13	0.15	0.15	0.15	0.17	0.17
v/c Ratio	0.73	0.76	0.45	0.30	0.59	0.56	0.76	0.77	0.25	0.81	0.49	0.43
Control Delay	28.7	28.6	5.9	20.5	30.6	6.5	59.6	57.2	1.5	60.4	46.2	8.5
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	28.7	28.6	5.9	20.5	30.6	6.5	59.6	57.2	1.5	60.4	46.2	8.5
LOS	C	C	A	C	C	A	E	E	A	E	D	A
Approach Delay		23.9			21.6			51.6			45.2	
Approach LOS		C			C			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 112.6	
Natural Cycle: 80	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 31.6	Intersection LOS: C
Intersection Capacity Utilization 79.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 5: CR 5 & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	247	1256	399	43	781	464	322	383	95	398	280	174
Future Volume (veh/h)	247	1256	399	43	781	464	322	383	95	398	280	174
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	257	1308	416	45	814	483	335	399	99	415	292	181
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	345	1766	744	177	1529	638	401	485	216	481	567	253
Arrive On Green	0.10	0.50	0.47	0.03	0.43	0.40	0.12	0.14	0.14	0.14	0.16	0.16
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	3554	1585	3456	3554	1585
Grp Volume(v), veh/h	257	1308	416	45	814	483	335	399	99	415	292	181
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1777	1585	1728	1777	1585
Q Serve(g_s), s	8.8	31.8	20.5	1.6	18.4	28.4	10.3	11.9	6.3	12.8	8.2	11.8
Cycle Q Clear(g_c), s	8.8	31.8	20.5	1.6	18.4	28.4	10.3	11.9	6.3	12.8	8.2	11.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	345	1766	744	177	1529	638	401	485	216	481	567	253
V/C Ratio(X)	0.74	0.74	0.56	0.25	0.53	0.76	0.84	0.82	0.46	0.86	0.51	0.72
Avail Cap(c_a), veh/h	461	1766	744	214	1529	638	541	654	292	604	719	321
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.2	21.8	20.7	21.0	22.9	27.9	47.0	45.6	43.2	45.8	41.8	43.3
Incr Delay (d2), s/veh	2.8	2.8	3.0	0.3	1.3	8.2	6.3	4.6	0.6	8.7	0.3	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	12.5	7.6	0.6	7.4	11.5	4.6	5.4	2.4	5.9	3.5	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.0	24.6	23.8	21.3	24.2	36.0	53.3	50.3	43.8	54.5	42.1	46.8
LnGrp LOS	C	C	C	C	C	D	D	D	D	D	D	D
Approach Vol, veh/h		1981			1342			833			888	
Approach Delay, s/veh		24.1			28.4			50.7			48.8	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.7	57.0	18.6	23.3	17.0	49.8	21.1	20.8
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	51.0	17.0	22.0	18.0	39.0	19.0	20.0
Max Q Clear Time (g_c+I1), s	3.6	33.8	12.3	13.8	10.8	30.4	14.8	13.9
Green Ext Time (p_c), s	0.0	12.1	0.3	0.9	0.2	5.4	0.4	1.0

Intersection Summary	
HCM 6th Ctrl Delay	34.0
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1674	75	89	1288	0	80
Future Vol, veh/h	1674	75	89	1288	0	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	220	110	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1781	80	95	1370	0	85

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1861	0	-	891
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.14	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.22	-	-	3.32
Pot Cap-1 Maneuver	-	-	321	-	0	285
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	321	-	-	285
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	22.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	285	-	-	321	-
HCM Lane V/C Ratio	0.299	-	-	0.295	-
HCM Control Delay (s)	22.9	-	-	20.8	-
HCM Lane LOS	C	-	-	C	-
HCM 95th %tile Q(veh)	1.2	-	-	1.2	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1602	152	100	1261	116	101
Future Volume (vph)	1602	152	100	1261	116	101
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	3	
Permitted Phases		2	6			3
Detector Phase	2	2	1	6	3	3
Switch Phase						
Minimum Initial (s)	25.0	25.0	5.0	25.0	5.0	5.0
Minimum Split (s)	31.0	31.0	11.0	31.0	11.0	11.0
Total Split (s)	69.0	69.0	11.0	80.0	30.0	30.0
Total Split (%)	62.7%	62.7%	10.0%	72.7%	27.3%	27.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	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
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Max	Max	None	Max	None	None
Act Effct Green (s)	63.1	63.1	74.1	74.1	12.1	12.1
Actuated g/C Ratio	0.64	0.64	0.75	0.75	0.12	0.12
v/c Ratio	0.75	0.15	0.59	0.50	0.57	0.38
Control Delay	15.3	2.4	22.2	5.9	50.8	13.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	2.4	22.2	5.9	50.8	13.8
LOS	B	A	C	A	D	B
Approach Delay	14.2			7.1	33.6	
Approach LOS	B			A	C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 98.2	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 12.5	Intersection LOS: B
Intersection Capacity Utilization 71.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: Waterford St & Erie Pkwy

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1602	152	100	1261	116	101
Future Volume (veh/h)	1602	152	100	1261	116	101
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1704	162	106	1341	123	107
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2369	1057	252	2770	168	149
Arrive On Green	0.67	0.67	0.05	0.78	0.09	0.09
Sat Flow, veh/h	3647	1585	1781	3647	1781	1585
Grp Volume(v), veh/h	1704	162	106	1341	123	107
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1781	1585
Q Serve(g_s), s	29.1	3.6	1.6	12.7	6.4	6.2
Cycle Q Clear(g_c), s	29.1	3.6	1.6	12.7	6.4	6.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2369	1057	252	2770	168	149
V/C Ratio(X)	0.72	0.15	0.42	0.48	0.73	0.72
Avail Cap(c_a), veh/h	2369	1057	258	2770	450	401
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.1	5.9	12.5	3.7	41.8	41.8
Incr Delay (d2), s/veh	1.9	0.3	1.1	0.6	6.1	6.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.8	1.2	1.0	2.4	3.1	2.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.0	6.2	13.6	4.3	47.9	48.0
LnGrp LOS	B	A	B	A	D	D
Approach Vol, veh/h	1866			1447	230	
Approach Delay, s/veh	11.5			5.0	48.0	
Approach LOS	B			A	D	

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	10.7	69.3				80.0	14.9
Change Period (Y+Rc), s	6.0	6.0				6.0	6.0
Max Green Setting (Gmax), s	5.0	63.0				74.0	24.0
Max Q Clear Time (g_c+I1), s	3.6	31.1				14.7	8.4
Green Ext Time (p_c), s	0.0	16.5				12.5	0.6

Intersection Summary							
HCM 6th Ctrl Delay			11.2				
HCM 6th LOS			B				

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1535	168	122	1186	175	251
Future Volume (vph)	1535	168	122	1186	175	251
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	3	
Permitted Phases		2	6		3	3
Detector Phase	2	2	1	6	3	3
Switch Phase						
Minimum Initial (s)	25.0	25.0	5.0	25.0	5.0	5.0
Minimum Split (s)	31.0	31.0	11.0	31.0	11.0	11.0
Total Split (s)	64.0	64.0	11.0	75.0	35.0	35.0
Total Split (%)	58.2%	58.2%	10.0%	68.2%	31.8%	31.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	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
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Max	Max	None	Max	None	None
Act Effct Green (s)	58.2	58.2	69.2	69.2	16.5	16.5
Actuated g/C Ratio	0.60	0.60	0.71	0.71	0.17	0.17
v/c Ratio	0.78	0.18	0.76	0.50	0.62	0.76
Control Delay	19.1	3.5	42.3	8.0	46.9	38.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.1	3.5	42.3	8.0	46.9	38.1
LOS	B	A	D	A	D	D
Approach Delay	17.6			11.2	41.7	
Approach LOS	B			B	D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 97.7	
Natural Cycle: 65	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 18.1	Intersection LOS: B
Intersection Capacity Utilization 73.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: Future Access & Erie Pkwy

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1535	168	122	1186	175	251
Future Volume (veh/h)	1535	168	122	1186	175	251
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1633	179	130	1262	186	267
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2054	916	215	2438	346	308
Arrive On Green	0.58	0.58	0.05	0.69	0.19	0.19
Sat Flow, veh/h	3647	1585	1781	3647	1781	1585
Grp Volume(v), veh/h	1633	179	130	1262	186	267
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1781	1585
Q Serve(g_s), s	36.1	5.4	2.8	17.4	9.4	16.4
Cycle Q Clear(g_c), s	36.1	5.4	2.8	17.4	9.4	16.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2054	916	215	2438	346	308
V/C Ratio(X)	0.79	0.20	0.61	0.52	0.54	0.87
Avail Cap(c_a), veh/h	2054	916	217	2438	514	457
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.6	10.1	19.9	7.7	36.4	39.2
Incr Delay (d2), s/veh	3.3	0.5	4.7	0.8	1.3	11.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.0	1.9	2.0	5.1	4.2	7.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	19.8	10.6	24.6	8.5	37.7	50.3
LnGrp LOS	B	B	C	A	D	D
Approach Vol, veh/h	1812			1392	453	
Approach Delay, s/veh	18.9			10.0	45.1	
Approach LOS	B			A	D	

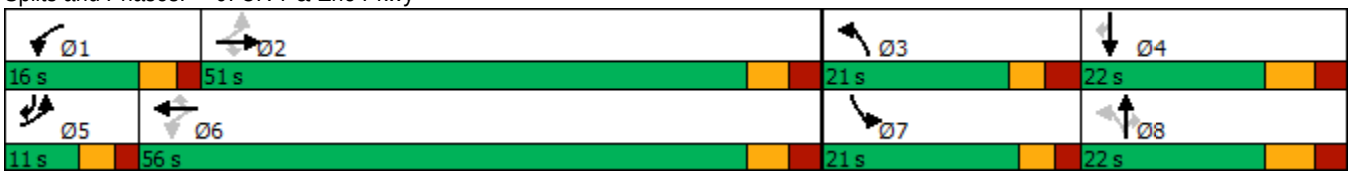
Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	10.9	64.1				75.0	25.6
Change Period (Y+Rc), s	6.0	6.0				6.0	6.0
Max Green Setting (Gmax), s	5.0	58.0				69.0	29.0
Max Q Clear Time (g_c+I1), s	4.8	38.1				19.4	18.4
Green Ext Time (p_c), s	0.0	12.0				11.0	1.2

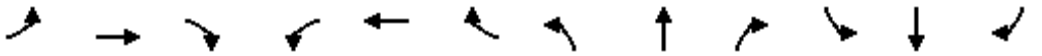
Intersection Summary							
HCM 6th Ctrl Delay			18.8				
HCM 6th LOS			B				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	240	1435	111	188	919	221	150	360	73	401	335	239
Future Volume (vph)	240	1435	111	188	919	221	150	360	73	401	335	239
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		2	6		6	8		8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0
Minimum Split (s)	10.0	16.3	16.3	10.0	16.3	16.3	10.8	16.8	16.8	10.0	16.8	10.0
Total Split (s)	11.0	51.0	51.0	16.0	56.0	56.0	21.0	22.0	22.0	21.0	22.0	11.0
Total Split (%)	10.0%	46.4%	46.4%	14.5%	50.9%	50.9%	19.1%	20.0%	20.0%	19.1%	20.0%	10.0%
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.5	3.0	4.0	4.0	3.0	4.0	3.0
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	2.8	2.8	2.8	2.0	2.8	2.0
Lost Time Adjust (s)	-2.0	-3.0	0.0	0.0	-3.0	0.0	-2.0	-2.0	0.0	-2.0	-2.0	0.0
Total Lost Time (s)	3.0	3.3	6.3	5.0	3.3	6.3	3.8	4.8	6.8	3.0	4.8	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead
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)	56.5	48.2	45.2	61.6	52.7	49.7	31.5	16.5	14.5	17.5	19.2	30.0
Actuated g/C Ratio	0.52	0.44	0.42	0.57	0.48	0.46	0.29	0.15	0.13	0.16	0.18	0.28
v/c Ratio	0.82	0.95	0.16	0.81	0.56	0.27	0.43	0.70	0.23	0.76	0.56	0.44
Control Delay	37.4	44.5	2.3	48.5	21.6	3.2	29.4	51.5	1.6	53.6	45.4	13.5
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	37.4	44.5	2.3	48.5	21.6	3.2	29.4	51.5	1.6	53.6	45.4	13.5
LOS	D	D	A	D	C	A	C	D	A	D	D	B
Approach Delay		40.9			22.4			39.6			41.0	
Approach LOS		D			C			D			D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 108.8	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 35.5	Intersection LOS: D
Intersection Capacity Utilization 86.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 9: CR 7 & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	1435	111	188	919	221	150	360	73	401	335	239
Future Volume (veh/h)	240	1435	111	188	919	221	150	360	73	401	335	239
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	250	1495	116	196	957	230	156	375	76	418	349	249
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	341	1669	700	227	1753	737	340	512	199	539	650	349
Arrive On Green	0.07	0.47	0.44	0.08	0.49	0.47	0.11	0.14	0.13	0.16	0.18	0.16
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	3554	1585	3456	3554	1585
Grp Volume(v), veh/h	250	1495	116	196	957	230	156	375	76	418	349	249
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1777	1585	1728	1777	1585
Q Serve(g_s), s	8.0	41.2	4.7	6.4	20.0	9.7	7.7	10.8	4.7	12.4	9.5	15.5
Cycle Q Clear(g_c), s	8.0	41.2	4.7	6.4	20.0	9.7	7.7	10.8	4.7	12.4	9.5	15.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	341	1669	700	227	1753	737	340	512	199	539	650	349
V/C Ratio(X)	0.73	0.90	0.17	0.86	0.55	0.31	0.46	0.73	0.38	0.77	0.54	0.71
Avail Cap(c_a), veh/h	341	1669	700	268	1753	737	431	572	225	582	650	349
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.7	26.0	18.0	24.3	18.8	17.9	32.8	43.8	42.9	43.3	39.6	38.5
Incr Delay (d2), s/veh	7.9	7.9	0.5	21.4	1.2	1.1	1.0	4.3	1.2	6.1	0.9	6.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	17.2	1.7	3.7	7.7	3.5	3.3	4.9	1.9	5.6	4.1	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.6	33.9	18.5	45.7	20.0	19.0	33.7	48.1	44.2	49.3	40.4	45.3
LnGrp LOS	C	C	B	D	C	B	C	D	D	D	D	D
Approach Vol, veh/h		1861			1383			607			1016	
Approach Delay, s/veh		31.7			23.5			43.9			45.3	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.5	53.5	15.5	24.3	11.0	56.0	19.7	20.2
Change Period (Y+Rc), s	5.0	* 6.3	* 5.8	* 6.8	5.0	* 6.3	5.0	* 6.8
Max Green Setting (Gmax), s	11.0	* 45	* 15	* 15	6.0	* 50	16.0	* 15
Max Q Clear Time (g_c+I1), s	8.4	43.2	9.7	17.5	10.0	22.0	14.4	12.8
Green Ext Time (p_c), s	0.1	1.3	0.2	0.0	0.0	7.6	0.3	0.6

Intersection Summary	
HCM 6th Ctrl Delay	33.7
HCM 6th LOS	C

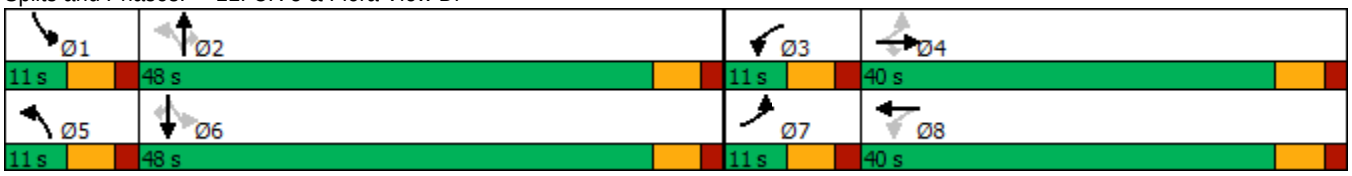
Notes

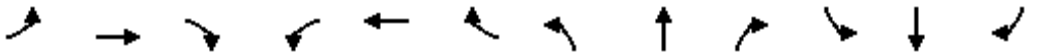
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	13	40	106	32	45	140	531	40	95	535	20
Future Volume (vph)	13	40	106	32	45	140	531	40	95	535	20
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	10.0	10.0	5.0	10.0	5.0	25.0	25.0	5.0	25.0	25.0
Minimum Split (s)	11.0	40.0	40.0	11.0	40.0	11.0	36.0	36.0	11.0	36.0	36.0
Total Split (s)	11.0	40.0	40.0	11.0	40.0	11.0	48.0	48.0	11.0	48.0	48.0
Total Split (%)	10.0%	36.4%	36.4%	10.0%	36.4%	10.0%	43.6%	43.6%	10.0%	43.6%	43.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	13.6	10.8	10.8	15.9	15.0	48.6	44.7	44.7	47.3	42.2	42.2
Actuated g/C Ratio	0.17	0.13	0.13	0.19	0.18	0.59	0.54	0.54	0.57	0.51	0.51
v/c Ratio	0.06	0.18	0.34	0.13	0.45	0.38	0.56	0.05	0.25	0.60	0.02
Control Delay	25.2	35.3	5.7	26.2	13.9	10.3	17.5	0.1	8.6	18.7	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	25.2	35.3	5.7	26.2	13.9	10.3	17.5	0.1	8.6	18.7	0.1
LOS	C	D	A	C	B	B	B	A	A	B	A
Approach Delay		14.8			15.8		15.1			16.6	
Approach LOS		B			B		B			B	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 82.4	
Natural Cycle: 100	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 15.7	Intersection LOS: B
Intersection Capacity Utilization 61.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 11: CR 5 & Flora View Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	40	106	32	45	132	140	531	40	95	535	20
Future Volume (veh/h)	13	40	106	32	45	132	140	531	40	95	535	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	14	43	113	34	48	140	149	565	43	101	569	21
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	158	244	207	278	62	180	417	936	794	411	926	785
Arrive On Green	0.02	0.13	0.13	0.03	0.15	0.15	0.06	0.50	0.50	0.05	0.50	0.50
Sat Flow, veh/h	1781	1870	1585	1781	421	1228	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	14	43	113	34	0	188	149	565	43	101	569	21
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1649	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.6	1.7	5.7	1.4	0.0	9.3	3.5	18.3	1.2	2.3	18.7	0.6
Cycle Q Clear(g_c), s	0.6	1.7	5.7	1.4	0.0	9.3	3.5	18.3	1.2	2.3	18.7	0.6
Prop In Lane	1.00		1.00	1.00		0.74	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	158	244	207	278	0	241	417	936	794	411	926	785
V/C Ratio(X)	0.09	0.18	0.55	0.12	0.00	0.78	0.36	0.60	0.05	0.25	0.61	0.03
Avail Cap(c_a), veh/h	234	750	635	325	0	661	417	936	794	421	926	785
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.5	32.8	34.5	30.3	0.0	34.9	11.7	15.2	10.9	11.3	15.5	11.0
Incr Delay (d2), s/veh	0.2	0.3	2.2	0.2	0.0	5.4	0.5	2.9	0.1	0.3	3.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.8	2.3	0.6	0.0	4.0	1.2	7.4	0.4	0.8	7.6	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.7	33.2	36.8	30.5	0.0	40.3	12.2	18.0	11.0	11.6	18.6	11.0
LnGrp LOS	C	C	D	C	A	D	B	B	B	B	B	B
Approach Vol, veh/h		170			222			757			691	
Approach Delay, s/veh		35.4			38.8			16.5			17.3	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.5	48.5	8.8	17.1	11.0	48.0	7.4	18.4
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	42.0	5.0	34.0	5.0	42.0	5.0	34.0
Max Q Clear Time (g_c+I1), s	4.3	20.3	3.4	7.7	5.5	20.7	2.6	11.3
Green Ext Time (p_c), s	0.0	3.4	0.0	0.6	0.0	3.4	0.0	1.1

Intersection Summary	
HCM 6th Ctrl Delay	21.2
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1	2	469	719	1
Future Vol, veh/h	0	1	2	469	719	1
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	-	220	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	2	499	765	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1020	383	766	0	-	0
Stage 1	766	-	-	-	-	-
Stage 2	254	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	233	615	843	-	-	-
Stage 1	419	-	-	-	-	-
Stage 2	765	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	233	615	843	-	-	-
Mov Cap-2 Maneuver	233	-	-	-	-	-
Stage 1	418	-	-	-	-	-
Stage 2	765	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	843	-	615	-	-
HCM Lane V/C Ratio	0.003	-	0.002	-	-
HCM Control Delay (s)	9.3	-	10.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Lane Group	EBT	WBL	WBT	NBT	NBR	SBL	SBT	Ø5	Ø7
Lane Configurations									
Traffic Volume (vph)	100	353	150	418	403	79	622		
Future Volume (vph)	100	353	150	418	403	79	622		
Turn Type	NA	pm+pt	NA	NA	Perm	pm+pt	NA		
Protected Phases	4	3	8	2		1	6	5	7
Permitted Phases		8			2	6			
Detector Phase	4	3	8	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
Minimum Split (s)	20.0	10.0	20.0	20.0	20.0	10.0	20.0	10.0	10.0
Total Split (s)	25.0	20.0	26.0	54.0	54.0	11.0	54.0	11.0	19.0
Total Split (%)	22.7%	18.2%	23.6%	49.1%	49.1%	10.0%	49.1%	10%	17%
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		
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Lead/Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	15.8	31.8	16.8	49.1	49.1	55.1	49.1		
Actuated g/C Ratio	0.15	0.30	0.16	0.46	0.46	0.52	0.46		
v/c Ratio	0.38	0.87	0.75	0.27	0.45	0.17	0.40		
Control Delay	44.4	51.9	55.5	18.5	3.4	12.3	20.2		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	44.4	51.9	55.5	18.5	3.4	12.3	20.2		
LOS	D	D	E	B	A	B	C		
Approach Delay	44.4		53.2	11.1			19.3		
Approach LOS	D		D	B			B		

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 105.9	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 26.1	Intersection LOS: C
Intersection Capacity Utilization 60.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 13: CR 7 & Flora View Dr

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	100	0	353	150	58	0	418	403	79	622	0
Future Volume (veh/h)	0	100	0	353	150	58	0	418	403	79	622	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	106	0	376	160	62	0	445	429	84	662	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	337	256	0	435	188	73	441	1670	745	544	1670	745
Arrive On Green	0.00	0.14	0.00	0.14	0.15	0.15	0.00	0.47	0.47	0.06	0.47	0.00
Sat Flow, veh/h	1781	1870	0	1781	1283	497	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	0	106	0	376	0	222	0	445	429	84	662	0
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	0	1781	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	0.0	5.4	0.0	15.0	0.0	12.7	0.0	7.9	20.5	2.4	12.7	0.0
Cycle Q Clear(g_c), s	0.0	5.4	0.0	15.0	0.0	12.7	0.0	7.9	20.5	2.4	12.7	0.0
Prop In Lane	1.00		0.00	1.00		0.28	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	337	256	0	435	0	261	441	1670	745	544	1670	745
V/C Ratio(X)	0.00	0.41	0.00	0.86	0.00	0.85	0.00	0.27	0.58	0.15	0.40	0.00
Avail Cap(c_a), veh/h	337	359	0	435	0	359	441	1670	745	544	1670	745
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	41.2	0.0	36.0	0.0	43.4	0.0	16.8	20.1	12.6	18.0	0.0
Incr Delay (d2), s/veh	0.0	1.1	0.0	19.9	0.0	13.2	0.0	0.4	3.2	0.6	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.6	0.0	4.5	0.0	6.5	0.0	3.1	8.0	1.0	5.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	42.2	0.0	55.9	0.0	56.6	0.0	17.1	23.3	13.2	18.7	0.0
LnGrp LOS	A	D	A	E	A	E	A	B	C	B	B	A
Approach Vol, veh/h		106			598			874			746	
Approach Delay, s/veh		42.2			56.2			20.2			18.1	
Approach LOS		D			E			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	54.0	20.0	19.3	11.0	54.0	19.0	20.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	6.0	49.0	15.0	20.0	6.0	49.0	14.0	21.0
Max Q Clear Time (g_c+I1), s	4.4	22.5	17.0	7.4	0.0	14.7	0.0	14.7
Green Ext Time (p_c), s	0.0	4.4	0.0	0.3	0.0	4.5	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	29.8
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	48	20	691	42	13	660
Future Vol, veh/h	48	20	691	42	13	660
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	-	-	0	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	22	759	46	14	725

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1150	380	0	0	805	0
Stage 1	759	-	-	-	-	-
Stage 2	391	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	192	618	-	-	815	-
Stage 1	423	-	-	-	-	-
Stage 2	653	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	189	618	-	-	815	-
Mov Cap-2 Maneuver	189	-	-	-	-	-
Stage 1	423	-	-	-	-	-
Stage 2	642	-	-	-	-	-

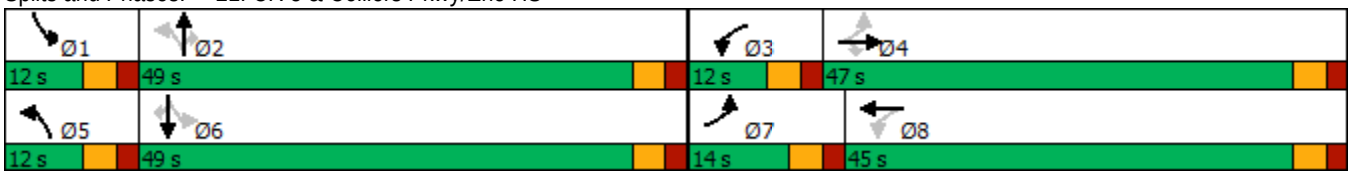
Approach	WB	NB	SB
HCM Control Delay, s	27	0	0.2
HCM LOS	D		

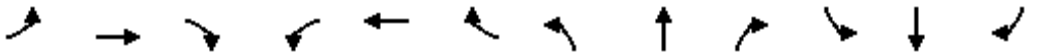
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	237	815	-
HCM Lane V/C Ratio	-	-	0.315	0.018	-
HCM Control Delay (s)	-	-	27	9.5	-
HCM Lane LOS	-	-	D	A	-
HCM 95th %tile Q(veh)	-	-	1.3	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	39	5	116	55	13	184	667	21	42	622	44
Future Volume (vph)	39	5	116	55	13	184	667	21	42	622	44
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	20.0	20.0	10.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0
Total Split (s)	14.0	47.0	47.0	12.0	45.0	12.0	49.0	49.0	12.0	49.0	49.0
Total Split (%)	11.7%	39.2%	39.2%	10.0%	37.5%	10.0%	40.8%	40.8%	10.0%	40.8%	40.8%
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	Max	Max	None	Max	Max
Act Effct Green (s)	12.9	7.1	7.1	13.0	8.9	53.7	49.6	49.6	50.5	44.2	44.2
Actuated g/C Ratio	0.16	0.09	0.09	0.16	0.11	0.65	0.60	0.60	0.61	0.53	0.53
v/c Ratio	0.17	0.03	0.50	0.25	0.21	0.40	0.34	0.02	0.09	0.36	0.05
Control Delay	27.8	35.6	14.8	29.3	21.9	8.4	11.0	0.0	6.2	12.6	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	27.8	35.6	14.8	29.3	21.9	8.4	11.0	0.0	6.2	12.6	0.1
LOS	C	D	B	C	C	A	B	A	A	B	A
Approach Delay		18.5			26.2		10.2			11.4	
Approach LOS		B			C		B			B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 82.7	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 12.2	Intersection LOS: B
Intersection Capacity Utilization 49.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 21: CR 5 & Colliers Pkwy/Erie HS





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	5	116	55	13	27	184	667	21	42	622	44
Future Volume (veh/h)	39	5	116	55	13	27	184	667	21	42	622	44
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	5	126	60	14	29	200	725	23	46	676	48
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	277	198	168	298	62	128	527	2016	899	483	1894	845
Arrive On Green	0.04	0.11	0.11	0.05	0.11	0.11	0.07	0.57	0.57	0.04	0.53	0.53
Sat Flow, veh/h	1781	1870	1585	1781	543	1125	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	42	5	126	60	0	43	200	725	23	46	676	48
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1668	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	1.7	0.2	6.4	2.4	0.0	1.9	4.1	9.2	0.5	0.9	9.1	1.2
Cycle Q Clear(g_c), s	1.7	0.2	6.4	2.4	0.0	1.9	4.1	9.2	0.5	0.9	9.1	1.2
Prop In Lane	1.00		1.00	1.00		0.67	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	277	198	168	298	0	190	527	2016	899	483	1894	845
V/C Ratio(X)	0.15	0.03	0.75	0.20	0.00	0.23	0.38	0.36	0.03	0.10	0.36	0.06
Avail Cap(c_a), veh/h	404	951	806	368	0	808	547	2016	899	564	1894	845
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.0	33.1	35.9	30.8	0.0	33.3	7.9	9.7	7.8	8.0	11.1	9.3
Incr Delay (d2), s/veh	0.3	0.1	6.6	0.3	0.0	0.6	0.4	0.5	0.1	0.1	0.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.1	2.7	1.1	0.0	0.8	1.3	3.0	0.2	0.3	3.1	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.3	33.1	42.5	31.1	0.0	33.9	8.3	10.2	7.9	8.1	11.7	9.4
LnGrp LOS	C	C	D	C	A	C	A	B	A	A	B	A
Approach Vol, veh/h		173			103			948			770	
Approach Delay, s/veh		39.5			32.3			9.8			11.3	
Approach LOS		D			C			A			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	51.8	8.7	13.7	11.1	49.0	8.1	14.4
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	44.0	7.0	42.0	7.0	44.0	9.0	40.0
Max Q Clear Time (g_c+I1), s	2.9	11.2	4.4	8.4	6.1	11.1	3.7	3.9
Green Ext Time (p_c), s	0.0	5.1	0.0	0.4	0.0	4.8	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	14.1
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	29	14	0	3	0	899	195	18	809	10
Future Vol, veh/h	0	0	29	14	0	3	0	899	195	18	809	10
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	-	-	0	-	-	-	-	-	250	125	-	120
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	0	0	34	16	0	3	0	1045	227	21	941	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	471	1558	2040	523	-	0	0	1272	0	0
Stage 1	-	-	-	1045	1045	-	-	-	-	-	-	-
Stage 2	-	-	-	513	995	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	7.54	6.54	6.94	-	-	-	4.14	-	-
Critical Hdwy Stg 1	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	3.52	4.02	3.32	-	-	-	2.22	-	-
Pot Cap-1 Maneuver	0	0	539	76	56	499	0	-	-	542	-	-
Stage 1	0	0	-	245	304	-	0	-	-	-	-	-
Stage 2	0	0	-	512	321	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	539	69	54	499	-	-	-	542	-	-
Mov Cap-2 Maneuver	-	-	-	69	54	-	-	-	-	-	-	-
Stage 1	-	-	-	245	304	-	-	-	-	-	-	-
Stage 2	-	-	-	461	308	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.1	63.2	0	0.3
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	539	81	542	-	-
HCM Lane V/C Ratio	-	-	0.063	0.244	0.039	-	-
HCM Control Delay (s)	-	-	12.1	63.2	11.9	-	-
HCM Lane LOS	-	-	B	F	B	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0.9	0.1	-	-

Intersection	
Intersection Delay, s/veh	12.3
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	340	354	682	612
Demand Flow Rate, veh/h	346	361	696	624
Vehicles Circulating, veh/h	694	653	225	367
Vehicles Exiting, veh/h	297	268	815	647
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	13.4	13.0	12.1	11.6
Approach LOS	B	B	B	B

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.050
Entry Flow, veh/h	346	361	696	624
Cap Entry Lane, veh/h	680	709	1097	1043
Entry HV Adj Factor	0.982	0.980	0.980	0.981
Flow Entry, veh/h	340	354	682	612
Cap Entry, veh/h	668	695	1075	1023
V/C Ratio	0.509	0.509	0.635	0.598
Control Delay, s/veh	13.4	13.0	12.1	11.6
LOS	B	B	B	B
95th %tile Queue, veh	3	3	5	4

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	241	3	6	333	0	18
Future Vol, veh/h	241	3	6	333	0	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	220	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	256	3	6	354	0	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	259	0	-	258
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.12	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.218	-	-	3.318
Pot Cap-1 Maneuver	-	-	1306	-	0	781
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1306	-	-	781
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	781	-	-	1306	-
HCM Lane V/C Ratio	0.025	-	-	0.005	-
HCM Control Delay (s)	9.7	-	-	7.8	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	242	16	9	311	28	26
Future Vol, veh/h	242	16	9	311	28	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	220	220	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	257	17	10	331	30	28

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	274	0	608	257
Stage 1	-	-	-	-	257	-
Stage 2	-	-	-	-	351	-
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	-	-	1289	-	459	782
Stage 1	-	-	-	-	786	-
Stage 2	-	-	-	-	713	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1289	-	455	782
Mov Cap-2 Maneuver	-	-	-	-	455	-
Stage 1	-	-	-	-	786	-
Stage 2	-	-	-	-	707	-

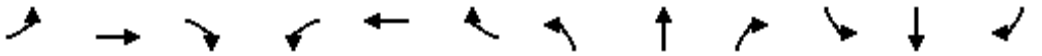
Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	11.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	455	782	-	-	1289	-
HCM Lane V/C Ratio	0.065	0.035	-	-	0.007	-
HCM Control Delay (s)	13.5	9.8	-	-	7.8	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	45	78	142	24	117	157	256	25	30	265	34
Future Volume (vph)	45	78	142	24	117	157	256	25	30	265	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	10.0	10.0	5.0	10.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	11.0	20.0	20.0	11.0	20.0	11.0	21.0	21.0	11.0	21.0	21.0
Total Split (s)	11.0	25.0	25.0	11.0	25.0	11.0	63.0	63.0	11.0	63.0	63.0
Total Split (%)	10.0%	22.7%	22.7%	10.0%	22.7%	10.0%	57.3%	57.3%	10.0%	57.3%	57.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	18.8	15.9	15.9	17.6	13.7	64.9	62.0	62.0	62.3	57.3	57.3
Actuated g/C Ratio	0.18	0.15	0.15	0.17	0.13	0.63	0.60	0.60	0.61	0.56	0.56
v/c Ratio	0.22	0.29	0.41	0.11	0.59	0.24	0.13	0.03	0.05	0.14	0.04
Control Delay	33.7	42.4	10.1	31.6	50.4	8.9	11.0	0.0	7.7	12.1	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	33.7	42.4	10.1	31.6	50.4	8.9	11.0	0.0	7.7	12.1	0.1
LOS	C	D	B	C	D	A	B	A	A	B	A
Approach Delay		23.6			47.6		9.6			10.5	
Approach LOS		C			D		A			B	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 102.6	
Natural Cycle: 65	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 18.1	Intersection LOS: B
Intersection Capacity Utilization 53.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 4: CR 7 & CR 10



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	78	142	24	117	23	157	256	25	30	265	34
Future Volume (veh/h)	45	78	142	24	117	23	157	256	25	30	265	34
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	48	83	151	26	124	24	167	272	27	32	282	36
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	171	220	187	205	162	31	724	2090	932	723	2018	900
Arrive On Green	0.04	0.12	0.12	0.03	0.11	0.11	0.05	0.59	0.59	0.03	0.57	0.57
Sat Flow, veh/h	1781	1870	1585	1781	1523	295	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	48	83	151	26	0	148	167	272	27	32	282	36
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1817	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	2.4	4.1	9.3	1.3	0.0	8.0	4.0	3.4	0.7	0.7	3.7	1.0
Cycle Q Clear(g_c), s	2.4	4.1	9.3	1.3	0.0	8.0	4.0	3.4	0.7	0.7	3.7	1.0
Prop In Lane	1.00		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	171	220	187	205	0	194	724	2090	932	723	2018	900
V/C Ratio(X)	0.28	0.38	0.81	0.13	0.00	0.76	0.23	0.13	0.03	0.04	0.14	0.04
Avail Cap(c_a), veh/h	194	354	300	248	0	344	724	2090	932	759	2018	900
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.2	40.9	43.2	38.4	0.0	43.6	8.2	9.2	8.7	8.3	10.2	9.6
Incr Delay (d2), s/veh	0.9	1.1	8.3	0.3	0.0	6.1	0.2	0.1	0.1	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	1.9	3.9	0.6	0.0	3.8	1.3	1.2	0.2	0.3	1.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.1	42.0	51.5	38.7	0.0	49.7	8.3	9.3	8.7	8.3	10.3	9.7
LnGrp LOS	D	D	D	D	A	D	A	A	A	A	B	A
Approach Vol, veh/h		282			174			466			350	
Approach Delay, s/veh		46.6			48.1			9.0			10.1	
Approach LOS		D			D			A			B	

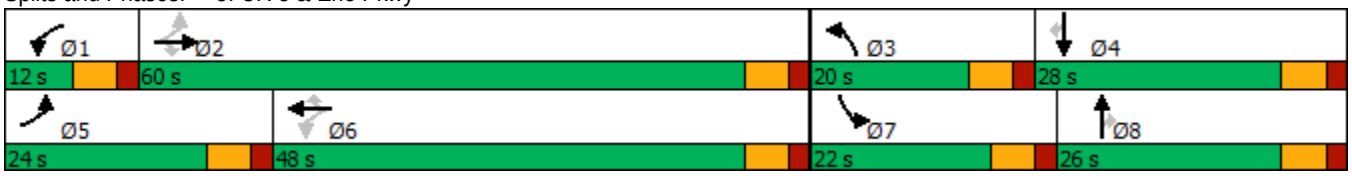
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	65.0	8.6	17.8	11.0	63.0	9.7	16.7
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	57.0	5.0	19.0	5.0	57.0	5.0	19.0
Max Q Clear Time (g_c+I1), s	2.7	5.4	3.3	11.3	6.0	5.7	4.4	10.0
Green Ext Time (p_c), s	0.0	1.8	0.0	0.5	0.0	1.9	0.0	0.4

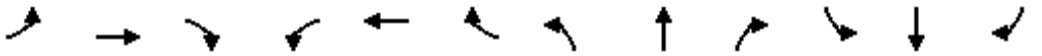
Intersection Summary	
HCM 6th Ctrl Delay	23.0
HCM 6th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	294	845	236	149	1105	345	279	312	70	408	349	350
Future Volume (vph)	294	845	236	149	1105	345	279	312	70	408	349	350
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	25.0	25.0	5.0	25.0	25.0	5.0	8.0	8.0	5.0	8.0	8.0
Minimum Split (s)	11.0	31.0	31.0	11.0	31.0	31.0	11.0	14.0	14.0	11.0	14.0	14.0
Total Split (s)	24.0	60.0	60.0	12.0	48.0	48.0	20.0	26.0	26.0	22.0	28.0	28.0
Total Split (%)	20.0%	50.0%	50.0%	10.0%	40.0%	40.0%	16.7%	21.7%	21.7%	18.3%	23.3%	23.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	-3.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	3.0	6.0	6.0	3.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	66.1	57.1	54.1	48.6	45.6	42.6	12.9	16.2	16.2	15.9	19.2	19.2
Actuated g/C Ratio	0.57	0.49	0.47	0.42	0.39	0.37	0.11	0.14	0.14	0.14	0.17	0.17
v/c Ratio	0.94	0.51	0.29	0.56	0.84	0.45	0.77	0.67	0.19	0.91	0.63	0.84
Control Delay	68.6	21.8	3.3	25.0	39.2	4.7	65.0	54.4	1.1	74.9	50.5	38.2
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	68.6	21.8	3.3	25.0	39.2	4.7	65.0	54.4	1.1	74.9	50.5	38.2
LOS	E	C	A	C	D	A	E	D	A	E	D	D
Approach Delay		28.7			30.4			53.2			55.6	
Approach LOS		C			C			D			E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116.2	
Natural Cycle: 80	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 39.0	Intersection LOS: D
Intersection Capacity Utilization 85.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: CR 5 & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	294	845	236	149	1105	345	279	312	70	408	349	350
Future Volume (veh/h)	294	845	236	149	1105	345	279	312	70	408	349	350
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	309	889	248	157	1163	363	294	328	74	429	367	368
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	335	1717	725	293	1401	585	351	542	242	469	663	296
Arrive On Green	0.14	0.48	0.46	0.05	0.39	0.37	0.10	0.15	0.15	0.14	0.19	0.19
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	3554	1585	3456	3554	1585
Grp Volume(v), veh/h	309	889	248	157	1163	363	294	328	74	429	367	368
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1777	1585	1728	1777	1585
Q Serve(g_s), s	14.4	20.3	11.9	6.0	34.8	22.1	9.9	10.2	4.9	14.5	11.1	22.0
Cycle Q Clear(g_c), s	14.4	20.3	11.9	6.0	34.8	22.1	9.9	10.2	4.9	14.5	11.1	22.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	335	1717	725	293	1401	585	351	542	242	469	663	296
V/C Ratio(X)	0.92	0.52	0.34	0.54	0.83	0.62	0.84	0.61	0.31	0.92	0.55	1.25
Avail Cap(c_a), veh/h	358	1717	725	293	1401	585	410	602	269	469	663	296
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.8	21.0	20.6	23.2	32.2	30.5	52.0	46.7	44.5	50.3	43.5	48.0
Incr Delay (d2), s/veh	26.9	1.1	1.3	1.0	5.8	4.9	11.0	0.8	0.3	22.2	0.6	135.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.2	8.1	4.6	2.7	15.0	9.1	4.8	4.5	1.9	7.6	4.9	19.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.8	22.1	21.9	24.3	38.0	35.4	63.0	47.5	44.7	72.5	44.1	183.5
LnGrp LOS	E	C	C	C	D	D	E	D	D	E	D	F
Approach Vol, veh/h		1446			1683			696			1164	
Approach Delay, s/veh		29.9			36.1			53.8			98.7	
Approach LOS		C			D			D			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	60.0	18.0	28.0	22.5	49.5	22.0	24.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	54.0	14.0	22.0	18.0	42.0	16.0	20.0
Max Q Clear Time (g_c+I1), s	8.0	22.3	11.9	24.0	16.4	36.8	16.5	12.2
Green Ext Time (p_c), s	0.0	10.9	0.1	0.0	0.1	4.1	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	51.4
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱	↰	↑↑	↱			↱			↱
Traffic Vol, veh/h	0	1299	23	45	1530	5	1	0	102	0	0	69
Future Vol, veh/h	0	1299	23	45	1530	5	1	0	102	0	0	69
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	-	-	220	110	-	220	-	-	0	-	-	0
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	0	1382	24	48	1628	5	1	0	109	0	0	73

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	1406	0	0	2292	-	691	-	-	814
Stage 1	-	-	-	-	-	-	1382	-	-	-	-	-
Stage 2	-	-	-	-	-	-	910	-	-	-	-	-
Critical Hdwy	-	-	-	4.14	-	-	7.54	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	-	-	-	-	-
Follow-up Hdwy	-	-	-	2.22	-	-	3.52	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	481	-	-	21	0	387	0	0	321
Stage 1	0	-	-	-	-	-	151	0	-	0	0	-
Stage 2	0	-	-	-	-	-	296	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	481	-	-	15	-	387	-	-	321
Mov Cap-2 Maneuver	-	-	-	-	-	-	15	-	-	-	-	-
Stage 1	-	-	-	-	-	-	151	-	-	-	-	-
Stage 2	-	-	-	-	-	-	206	-	-	-	-	-

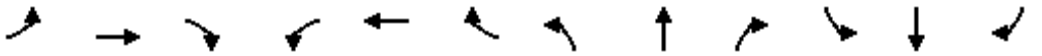
Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.4	17.9	19.5
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	387	-	-	481	-	-	321
HCM Lane V/C Ratio	0.28	-	-	0.1	-	-	0.229
HCM Control Delay (s)	17.9	-	-	13.3	-	-	19.5
HCM Lane LOS	C	-	-	B	-	-	C
HCM 95th %tile Q(veh)	1.1	-	-	0.3	-	-	0.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	50	1203	148	28	1264	51	226	0	172	0
Future Volume (vph)	50	1203	148	28	1264	51	226	0	172	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6		3	8	7	4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	7	4
Switch Phase										
Minimum Initial (s)	5.0	25.0	25.0	5.0	25.0	25.0	5.0	8.0	5.0	8.0
Minimum Split (s)	11.0	31.0	31.0	11.0	31.0	31.0	11.0	20.0	11.0	20.0
Total Split (s)	11.0	60.0	60.0	11.0	60.0	60.0	15.0	26.0	14.0	25.0
Total Split (%)	9.9%	54.1%	54.1%	9.9%	54.1%	54.1%	13.5%	23.4%	12.6%	22.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	Max	None	Max
Act Effct Green (s)	59.2	56.3	56.3	58.0	54.1	54.1	29.1	20.0	27.0	19.0
Actuated g/C Ratio	0.54	0.52	0.52	0.53	0.50	0.50	0.27	0.18	0.25	0.17
v/c Ratio	0.32	0.70	0.18	0.16	0.76	0.06	0.65	0.46	0.62	0.24
Control Delay	15.4	23.3	3.6	11.9	26.3	0.1	41.4	15.4	41.4	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.4	23.3	3.6	11.9	26.3	0.1	41.4	15.4	41.4	3.1
LOS	B	C	A	B	C	A	D	B	D	A
Approach Delay		20.9			25.0			29.9		28.3
Approach LOS		C			C			C		C

Intersection Summary	
Cycle Length: 111	
Actuated Cycle Length: 108.8	
Natural Cycle: 80	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 24.2	Intersection LOS: C
Intersection Capacity Utilization 77.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 7: Major N/S Collector & Erie Pkwy



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	1203	148	28	1264	51	226	0	179	172	0	90
Future Volume (veh/h)	50	1203	148	28	1264	51	226	0	179	172	0	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	53	1280	157	30	1345	54	240	0	190	183	0	96
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	204	1777	793	195	1744	778	366	0	288	279	0	274
Arrive On Green	0.04	0.50	0.50	0.03	0.49	0.49	0.08	0.00	0.18	0.07	0.00	0.17
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	0	1585	1781	0	1585
Grp Volume(v), veh/h	53	1280	157	30	1345	54	240	0	190	183	0	96
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	0	1585	1781	0	1585
Q Serve(g_s), s	1.6	31.0	6.0	0.9	34.1	2.0	9.0	0.0	12.3	8.0	0.0	5.9
Cycle Q Clear(g_c), s	1.6	31.0	6.0	0.9	34.1	2.0	9.0	0.0	12.3	8.0	0.0	5.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	204	1777	793	195	1744	778	366	0	288	279	0	274
V/C Ratio(X)	0.26	0.72	0.20	0.15	0.77	0.07	0.66	0.00	0.66	0.66	0.00	0.35
Avail Cap(c_a), veh/h	220	1777	793	228	1744	778	366	0	288	279	0	274
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.7	21.5	15.3	17.4	22.9	14.8	37.3	0.0	41.8	37.2	0.0	40.1
Incr Delay (d2), s/veh	0.7	2.6	0.6	0.4	3.4	0.2	4.2	0.0	11.3	5.5	0.0	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	12.1	2.3	0.4	13.6	0.7	2.0	0.0	5.7	1.3	0.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.4	24.0	15.8	17.8	26.3	14.9	41.5	0.0	53.1	42.7	0.0	43.6
LnGrp LOS	B	C	B	B	C	B	D	A	D	D	A	D
Approach Vol, veh/h		1490			1429			430			279	
Approach Delay, s/veh		23.0			25.7			46.6			43.0	
Approach LOS		C			C			D			D	

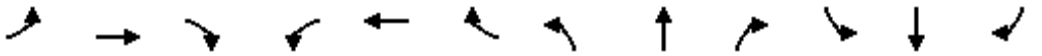
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	61.0	15.0	25.0	10.0	60.0	14.0	26.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	54.0	9.0	19.0	5.0	54.0	8.0	20.0
Max Q Clear Time (g_c+I1), s	2.9	33.0	11.0	7.9	3.6	36.1	10.0	14.3
Green Ext Time (p_c), s	0.0	9.3	0.0	0.3	0.0	8.7	0.0	0.5

Intersection Summary	
HCM 6th Ctrl Delay	28.4
HCM 6th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	82	1401	71	51	1206	82	43	0	78	0
Future Volume (vph)	82	1401	71	51	1206	82	43	0	78	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6		3	8	7	4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	7	4
Switch Phase										
Minimum Initial (s)	5.0	25.0	25.0	5.0	25.0	25.0	5.0	8.0	5.0	8.0
Minimum Split (s)	11.0	31.0	31.0	11.0	31.0	31.0	11.0	20.0	11.0	20.0
Total Split (s)	16.0	57.0	57.0	12.0	53.0	53.0	16.0	25.0	16.0	25.0
Total Split (%)	14.5%	51.8%	51.8%	10.9%	48.2%	48.2%	14.5%	22.7%	14.5%	22.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None
Act Effct Green (s)	59.3	55.4	55.4	56.5	54.0	54.0	13.5	8.4	16.4	11.7
Actuated g/C Ratio	0.66	0.61	0.61	0.63	0.60	0.60	0.15	0.09	0.18	0.13
v/c Ratio	0.30	0.69	0.07	0.25	0.61	0.09	0.20	0.19	0.32	0.24
Control Delay	9.7	19.5	0.1	10.4	18.8	0.5	31.8	1.3	33.9	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	19.5	0.1	10.4	18.8	0.5	31.8	1.3	33.9	1.3
LOS	A	B	A	B	B	A	C	A	C	A
Approach Delay		18.1			17.3			13.8		16.1
Approach LOS		B			B			B		B

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 90.1	
Natural Cycle: 80	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 17.5	Intersection LOS: B
Intersection Capacity Utilization 68.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 8: Minor N/S Collector & Erie Pkwy



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	82	1401	71	51	1206	82	43	0	62	78	0	94
Future Volume (veh/h)	82	1401	71	51	1206	82	43	0	62	78	0	94
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	87	1490	76	54	1283	87	46	0	66	83	0	100
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	280	1972	880	233	1944	867	204	0	137	242	0	167
Arrive On Green	0.05	0.55	0.55	0.04	0.55	0.55	0.04	0.00	0.09	0.06	0.00	0.11
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	0	1585	1781	0	1585
Grp Volume(v), veh/h	87	1490	76	54	1283	87	46	0	66	83	0	100
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	0	1585	1781	0	1585
Q Serve(g_s), s	1.9	29.5	2.1	1.2	23.5	2.4	2.1	0.0	3.6	3.8	0.0	5.5
Cycle Q Clear(g_c), s	1.9	29.5	2.1	1.2	23.5	2.4	2.1	0.0	3.6	3.8	0.0	5.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	280	1972	880	233	1944	867	204	0	137	242	0	167
V/C Ratio(X)	0.31	0.76	0.09	0.23	0.66	0.10	0.23	0.00	0.48	0.34	0.00	0.60
Avail Cap(c_a), veh/h	388	1972	880	277	1944	867	331	0	328	335	0	328
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.8	15.7	9.6	13.4	14.7	10.0	36.3	0.0	40.0	35.5	0.0	39.2
Incr Delay (d2), s/veh	0.6	2.8	0.2	0.5	1.8	0.2	0.6	0.0	2.6	0.8	0.0	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	10.5	0.7	0.4	8.3	0.9	0.9	0.0	1.5	1.7	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.4	18.4	9.8	13.9	16.5	10.2	36.8	0.0	42.6	36.3	0.0	42.6
LnGrp LOS	B	B	A	B	B	B	D	A	D	D	A	D
Approach Vol, veh/h		1653			1424			112			183	
Approach Delay, s/veh		17.7			16.0			40.2			39.8	
Approach LOS		B			B			D			D	

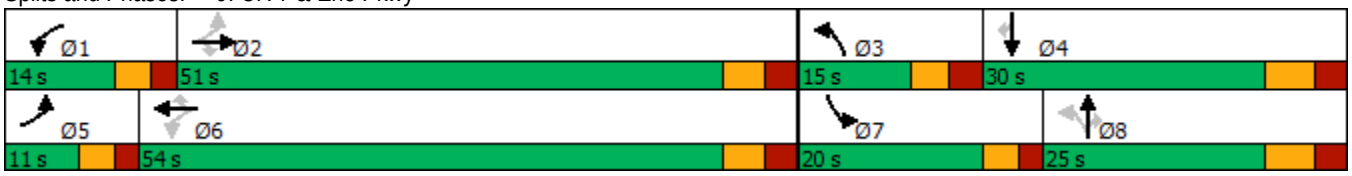
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.7	57.0	9.5	15.7	10.5	56.3	11.2	14.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	51.0	10.0	19.0	10.0	47.0	10.0	19.0
Max Q Clear Time (g_c+I1), s	3.2	31.5	4.1	7.5	3.9	25.5	5.8	5.6
Green Ext Time (p_c), s	0.0	10.4	0.0	0.3	0.1	9.2	0.1	0.2

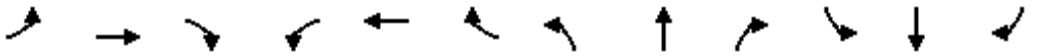
Intersection Summary	
HCM 6th Ctrl Delay	18.9
HCM 6th LOS	B

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	159	1304	79	153	987	187	163	200	26	245	266	189
Future Volume (vph)	159	1304	79	153	987	187	163	200	26	245	266	189
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.0	16.3	16.3	10.0	16.3	16.3	10.8	16.8	16.8	10.0	16.8	16.8
Total Split (s)	11.0	51.0	51.0	14.0	54.0	54.0	15.0	25.0	25.0	20.0	30.0	30.0
Total Split (%)	10.0%	46.4%	46.4%	12.7%	49.1%	49.1%	13.6%	22.7%	22.7%	18.2%	27.3%	27.3%
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.5	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	2.8	2.8	2.8	2.0	2.8	2.8
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	6.3	6.3	5.0	6.3	6.3	5.8	6.8	6.8	5.0	6.8	6.8
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)	52.3	45.0	45.0	57.8	47.7	47.7	22.0	11.9	11.9	12.6	14.5	14.5
Actuated g/C Ratio	0.52	0.44	0.44	0.57	0.47	0.47	0.22	0.12	0.12	0.12	0.14	0.14
v/c Ratio	0.65	0.88	0.11	0.71	0.63	0.23	0.59	0.51	0.09	0.61	0.56	0.51
Control Delay	24.7	34.5	0.6	36.4	22.8	3.2	37.3	47.0	0.6	48.9	44.6	11.5
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	24.7	34.5	0.6	36.4	22.8	3.2	37.3	47.0	0.6	48.9	44.6	11.5
LOS	C	C	A	D	C	A	D	D	A	D	D	B
Approach Delay		31.7			21.6			39.8			37.2	
Approach LOS		C			C			D			D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 101.3	
Natural Cycle: 80	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 30.1	Intersection LOS: C
Intersection Capacity Utilization 81.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 9: CR 7 & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	159	1304	79	153	987	187	163	200	26	245	266	189
Future Volume (veh/h)	159	1304	79	153	987	187	163	200	26	245	266	189
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	169	1387	84	163	1050	199	173	213	28	261	283	201
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	280	1614	720	228	1647	735	305	557	248	335	557	248
Arrive On Green	0.06	0.45	0.45	0.07	0.46	0.46	0.09	0.16	0.16	0.10	0.16	0.16
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	3554	1585	3456	3554	1585
Grp Volume(v), veh/h	169	1387	84	163	1050	199	173	213	28	261	283	201
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1777	1585	1728	1777	1585
Q Serve(g_s), s	5.3	36.0	3.1	5.0	23.2	7.9	8.3	5.5	1.6	7.6	7.5	12.6
Cycle Q Clear(g_c), s	5.3	36.0	3.1	5.0	23.2	7.9	8.3	5.5	1.6	7.6	7.5	12.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	280	1614	720	228	1647	735	305	557	248	335	557	248
V/C Ratio(X)	0.60	0.86	0.12	0.71	0.64	0.27	0.57	0.38	0.11	0.78	0.51	0.81
Avail Cap(c_a), veh/h	280	1614	720	263	1647	735	305	628	280	504	801	357
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.4	25.2	16.2	22.3	21.0	16.9	32.7	38.9	37.2	45.4	39.8	41.9
Incr Delay (d2), s/veh	3.6	6.2	0.3	7.5	1.9	0.9	2.4	0.4	0.2	4.4	0.7	8.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	14.8	1.1	2.2	9.0	2.9	3.6	2.4	0.6	3.3	3.2	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.0	31.4	16.5	29.8	22.9	17.8	35.2	39.4	37.4	49.8	40.5	50.7
LnGrp LOS	C	C	B	C	C	B	D	D	D	D	D	D
Approach Vol, veh/h		1640			1412			414			745	
Approach Delay, s/veh		29.5			23.0			37.5			46.5	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	53.0	15.0	22.9	11.0	54.0	15.0	22.9
Change Period (Y+Rc), s	5.0	* 6.3	* 5.8	* 6.8	5.0	* 6.3	5.0	* 6.8
Max Green Setting (Gmax), s	9.0	* 45	* 9.2	* 23	6.0	* 48	15.0	* 18
Max Q Clear Time (g_c+I1), s	7.0	38.0	10.3	14.6	7.3	25.2	9.6	7.5
Green Ext Time (p_c), s	0.1	4.5	0.0	1.5	0.0	7.8	0.4	0.9

Intersection Summary	
HCM 6th Ctrl Delay	31.1
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	25	587	16	6	703
Future Vol, veh/h	0	25	587	16	6	703
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	-	220	220	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	27	624	17	6	748

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	624	0	0	641	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	4.12	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	0	485	-	-	943	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	485	-	-	943	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

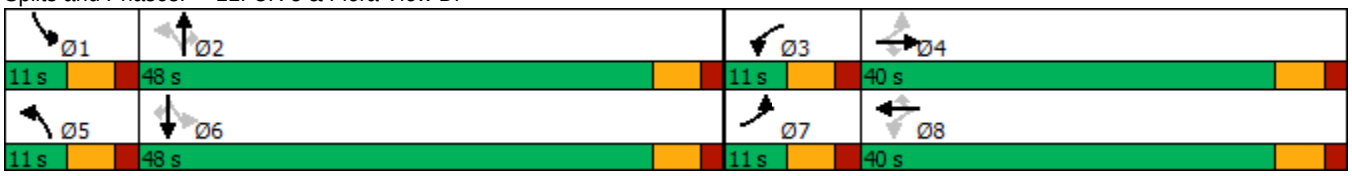
Approach	WB	NB	SB
HCM Control Delay, s	12.9	0	0.1
HCM LOS	B		

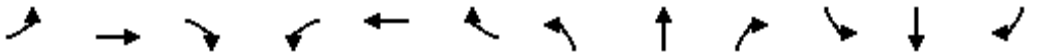
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	485	943	-
HCM Lane V/C Ratio	-	-	0.055	0.007	-
HCM Control Delay (s)	-	-	12.9	8.8	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	108	175	162	63	179	118	403	140	162	527	14
Future Volume (vph)	20	108	175	162	63	179	118	403	140	162	527	14
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	25.0	25.0	5.0	25.0	25.0
Minimum Split (s)	11.0	40.0	40.0	11.0	40.0	40.0	11.0	36.0	36.0	11.0	36.0	36.0
Total Split (s)	11.0	40.0	40.0	11.0	40.0	40.0	11.0	48.0	48.0	11.0	48.0	48.0
Total Split (%)	10.0%	36.4%	36.4%	10.0%	36.4%	36.4%	10.0%	43.6%	43.6%	10.0%	43.6%	43.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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	None	None	None	None	None	None	Max	Max	None	Max	Max
Act Effct Green (s)	16.6	11.6	11.6	20.3	18.4	18.4	47.0	42.0	42.0	47.0	42.0	42.0
Actuated g/C Ratio	0.19	0.13	0.13	0.23	0.21	0.21	0.54	0.48	0.48	0.54	0.48	0.48
v/c Ratio	0.08	0.47	0.50	0.60	0.17	0.40	0.36	0.48	0.18	0.38	0.63	0.02
Control Delay	24.9	41.5	10.5	38.4	32.3	8.1	11.2	18.1	3.1	11.2	21.3	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	0.0
Total Delay	24.9	41.5	10.5	38.4	32.3	8.1	11.2	18.1	3.1	11.2	21.3	0.1
LOS	C	D	B	D	C	A	B	B	A	B	C	A
Approach Delay		22.5			24.0			13.7			18.6	
Approach LOS		C			C			B			B	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 87.7	
Natural Cycle: 100	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 18.7	Intersection LOS: B
Intersection Capacity Utilization 64.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 11: CR 5 & Flora View Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	108	175	162	63	179	118	403	140	162	527	14
Future Volume (veh/h)	20	108	175	162	63	179	118	403	140	162	527	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	21	115	186	172	67	190	126	429	149	172	561	15
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	288	279	236	281	341	289	384	880	745	442	880	746
Arrive On Green	0.02	0.15	0.15	0.06	0.18	0.18	0.06	0.47	0.47	0.06	0.47	0.47
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	21	115	186	172	67	190	126	429	149	172	561	15
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.9	5.0	10.1	5.0	2.7	9.9	3.2	14.1	4.9	4.5	20.3	0.5
Cycle Q Clear(g_c), s	0.9	5.0	10.1	5.0	2.7	9.9	3.2	14.1	4.9	4.5	20.3	0.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	288	279	236	281	341	289	384	880	745	442	880	746
V/C Ratio(X)	0.07	0.41	0.79	0.61	0.20	0.66	0.33	0.49	0.20	0.39	0.64	0.02
Avail Cap(c_a), veh/h	348	712	603	281	712	603	384	880	745	442	880	746
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.0	34.5	36.6	33.3	31.0	33.9	13.5	16.3	13.8	12.5	17.9	12.6
Incr Delay (d2), s/veh	0.1	1.0	5.7	3.9	0.3	2.5	0.5	1.9	0.6	0.6	3.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	2.3	4.2	1.4	1.2	4.0	1.2	6.1	1.8	1.7	8.9	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.1	35.4	42.4	37.2	31.2	36.5	14.0	18.2	14.4	13.1	21.4	12.7
LnGrp LOS	C	D	D	D	C	D	B	B	B	B	C	B
Approach Vol, veh/h		322			429			704			748	
Approach Delay, s/veh		39.2			35.9			16.6			19.3	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	48.0	11.0	19.3	11.0	48.0	8.0	22.3
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	42.0	5.0	34.0	5.0	42.0	5.0	34.0
Max Q Clear Time (g_c+I1), s	6.5	16.1	7.0	12.1	5.2	22.3	2.9	11.9
Green Ext Time (p_c), s	0.0	3.2	0.0	1.2	0.0	3.5	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	24.6
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	1	437	424	2
Future Vol, veh/h	0	0	1	437	424	2
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	-	220	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	1	465	451	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	687	227	453	0	-	0
Stage 1	452	-	-	-	-	-
Stage 2	235	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	381	776	1104	-	-	-
Stage 1	608	-	-	-	-	-
Stage 2	782	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	381	776	1104	-	-	-
Mov Cap-2 Maneuver	381	-	-	-	-	-
Stage 1	607	-	-	-	-	-
Stage 2	782	-	-	-	-	-

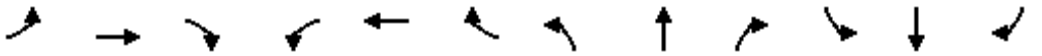
Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1104	-	-	-	-
HCM Lane V/C Ratio	0.001	-	-	-	-
HCM Control Delay (s)	8.3	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	65	75	255	125	10	311	204	30	380	7
Future Volume (vph)	65	75	255	125	10	311	204	30	380	7
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	11.0	20.0	11.0	20.0	11.0	21.0	21.0	11.0	21.0	21.0
Total Split (s)	18.0	25.0	18.0	25.0	11.0	56.0	56.0	11.0	56.0	56.0
Total Split (%)	16.4%	22.7%	16.4%	22.7%	10.0%	50.9%	50.9%	10.0%	50.9%	50.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Max	Max	None	Max	Max
Act Effct Green (s)	21.5	13.1	28.7	19.3	53.2	50.4	50.4	55.4	54.5	54.5
Actuated g/C Ratio	0.22	0.13	0.29	0.19	0.53	0.51	0.51	0.56	0.55	0.55
v/c Ratio	0.23	0.47	0.74	0.55	0.02	0.19	0.24	0.05	0.21	0.01
Control Delay	27.9	41.1	43.3	42.1	10.5	15.2	3.1	10.5	12.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.9	41.1	43.3	42.1	10.5	15.2	3.1	10.5	12.9	0.0
LOS	C	D	D	D	B	B	A	B	B	A
Approach Delay		36.2		42.8		10.4			12.5	
Approach LOS		D		D		B			B	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 99.7	
Natural Cycle: 65	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 23.0	Intersection LOS: C
Intersection Capacity Utilization 59.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 13: CR 7 & Flora View Dr



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	75	35	255	125	58	10	311	204	30	380	7
Future Volume (veh/h)	65	75	35	255	125	58	10	311	204	30	380	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	69	80	37	271	133	62	11	331	217	32	404	7
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	243	122	57	337	212	99	545	1796	801	516	1854	827
Arrive On Green	0.05	0.10	0.10	0.12	0.18	0.18	0.01	0.51	0.51	0.03	0.52	0.52
Sat Flow, veh/h	1781	1210	560	1781	1207	562	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	69	0	117	271	0	195	11	331	217	32	404	7
Grp Sat Flow(s),veh/h/ln	1781	0	1770	1781	0	1769	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	3.4	0.0	6.3	12.0	0.0	10.1	0.3	5.0	7.8	0.8	6.1	0.2
Cycle Q Clear(g_c), s	3.4	0.0	6.3	12.0	0.0	10.1	0.3	5.0	7.8	0.8	6.1	0.2
Prop In Lane	1.00		0.32	1.00		0.32	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	243	0	179	337	0	311	545	1796	801	516	1854	827
V/C Ratio(X)	0.28	0.00	0.65	0.81	0.00	0.63	0.02	0.18	0.27	0.06	0.22	0.01
Avail Cap(c_a), veh/h	376	0	340	337	0	340	612	1796	801	553	1854	827
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.4	0.0	42.8	34.8	0.0	37.8	11.6	13.3	14.0	11.0	12.8	11.4
Incr Delay (d2), s/veh	0.6	0.0	4.0	13.3	0.0	3.2	0.0	0.2	0.8	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	2.9	7.0	0.0	4.6	0.1	1.9	2.9	0.3	2.3	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.0	0.0	46.8	48.1	0.0	41.0	11.6	13.6	14.8	11.1	13.0	11.4
LnGrp LOS	D	A	D	D	A	D	B	B	B	B	B	B
Approach Vol, veh/h		186			466			559			443	
Approach Delay, s/veh		43.5			45.1			14.0			12.9	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	56.0	18.0	16.0	7.3	57.6	10.6	23.4
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	50.0	12.0	19.0	5.0	50.0	12.0	19.0
Max Q Clear Time (g_c+I1), s	2.8	9.8	14.0	8.3	2.3	8.1	5.4	12.1
Green Ext Time (p_c), s	0.0	2.8	0.0	0.4	0.0	2.6	0.1	0.5

Intersection Summary	
HCM 6th Ctrl Delay	25.8
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	22	9	525	664	5
Future Vol, veh/h	0	22	9	525	664	5
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	220	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	23	10	559	706	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	356	711	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	640	884	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	640	884	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	884	-	640	-	-
HCM Lane V/C Ratio	0.011	-	0.037	-	-
HCM Control Delay (s)	9.1	-	10.8	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	36	12	534	664	22
Future Vol, veh/h	0	36	12	534	664	22
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	220	-	-	220
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	38	13	568	706	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	353	729	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	643	871	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	643	871	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	871	-	643	-	-
HCM Lane V/C Ratio	0.015	-	0.06	-	-
HCM Control Delay (s)	9.2	-	11	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	4.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	151	188	89	127
Demand Flow Rate, veh/h	154	191	90	129
Vehicles Circulating, veh/h	133	71	134	204
Vehicles Exiting, veh/h	200	153	153	58
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.1	4.1	3.6	4.3
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	154	191	90	129
Cap Entry Lane, veh/h	1205	1283	1204	1121
Entry HV Adj Factor	0.978	0.982	0.989	0.984
Flow Entry, veh/h	151	188	89	127
Cap Entry, veh/h	1179	1261	1191	1102
V/C Ratio	0.128	0.149	0.075	0.115
Control Delay, s/veh	4.1	4.1	3.6	4.3
LOS	A	A	A	A
95th %tile Queue, veh	0	1	0	0

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	141	9	4	140	15	19
Future Vol, veh/h	141	9	4	140	15	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	150	10	4	149	16	20

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	160	0	312	155
Stage 1	-	-	-	-	155	-
Stage 2	-	-	-	-	157	-
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	-	-	1419	-	681	891
Stage 1	-	-	-	-	873	-
Stage 2	-	-	-	-	871	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1419	-	679	891
Mov Cap-2 Maneuver	-	-	-	-	679	-
Stage 1	-	-	-	-	873	-
Stage 2	-	-	-	-	868	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	679	891	-	-	1419	-
HCM Lane V/C Ratio	0.024	0.023	-	-	0.003	-
HCM Control Delay (s)	10.4	9.1	-	-	7.5	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	6	655	46	43	821
Future Vol, veh/h	4	6	655	46	43	821
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	-	-	0	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	7	799	56	52	1001

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1404	400	0	0	855	0
Stage 1	799	-	-	-	-	-
Stage 2	605	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	131	600	-	-	781	-
Stage 1	403	-	-	-	-	-
Stage 2	508	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	122	600	-	-	781	-
Mov Cap-2 Maneuver	122	-	-	-	-	-
Stage 1	403	-	-	-	-	-
Stage 2	474	-	-	-	-	-

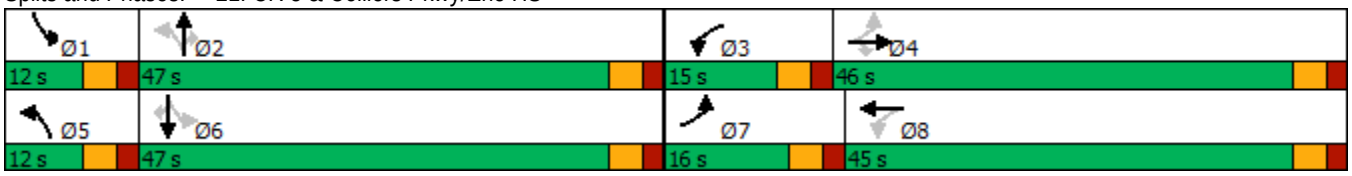
Approach	WB	NB	SB
HCM Control Delay, s	21.2	0	0.5
HCM LOS	C		

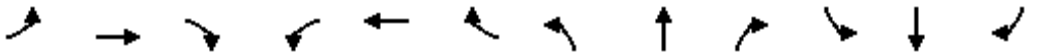
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	234	781	-
HCM Lane V/C Ratio	-	-	0.052	0.067	-
HCM Control Delay (s)	-	-	21.2	9.9	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	199	131	258	222	67	87	412	112	129	656	40
Future Volume (vph)	199	131	258	222	67	87	412	112	129	656	40
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	20.0	20.0	10.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0
Total Split (s)	16.0	46.0	46.0	15.0	45.0	12.0	47.0	47.0	12.0	47.0	47.0
Total Split (%)	13.3%	38.3%	38.3%	12.5%	37.5%	10.0%	39.2%	39.2%	10.0%	39.2%	39.2%
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)	30.9	19.9	19.9	28.9	18.8	49.3	42.3	42.3	49.4	42.3	42.3
Actuated g/C Ratio	0.31	0.20	0.20	0.29	0.19	0.50	0.43	0.43	0.50	0.43	0.43
v/c Ratio	0.87	0.51	0.82	0.89	0.64	0.47	0.40	0.22	0.47	0.63	0.08
Control Delay	52.1	39.5	33.8	54.4	34.6	19.6	22.1	4.3	18.6	26.1	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	52.1	39.5	33.8	54.4	34.6	19.6	22.1	4.3	18.6	26.1	0.6
LOS	D	D	C	D	C	B	C	A	B	C	A
Approach Delay		41.3			46.2		18.5			23.7	
Approach LOS		D			D		B			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 99.4	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 30.2	Intersection LOS: C
Intersection Capacity Utilization 62.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 21: CR 5 & Colliers Pkwy/Erie HS





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	199	131	258	222	67	90	87	412	112	129	656	40
Future Volume (veh/h)	199	131	258	222	67	90	87	412	112	129	656	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		0.91	0.93		0.91	0.98		0.98	0.99		0.90
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	288	190	374	322	97	130	126	597	162	187	951	58
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	417	538	413	457	191	256	262	1346	587	384	1358	543
Arrive On Green	0.10	0.29	0.29	0.09	0.28	0.28	0.06	0.38	0.38	0.06	0.38	0.38
Sat Flow, veh/h	1781	1870	1435	1781	686	919	1781	3554	1549	1781	3554	1421
Grp Volume(v), veh/h	288	190	374	322	0	227	126	597	162	187	951	58
Grp Sat Flow(s),veh/h/ln	1781	1870	1435	1781	0	1604	1781	1777	1549	1781	1777	1421
Q Serve(g_s), s	11.0	8.9	27.9	10.0	0.0	13.2	4.7	13.9	8.0	7.0	25.0	2.9
Cycle Q Clear(g_c), s	11.0	8.9	27.9	10.0	0.0	13.2	4.7	13.9	8.0	7.0	25.0	2.9
Prop In Lane	1.00		1.00	1.00		0.57	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	417	538	413	457	0	447	262	1346	587	384	1358	543
V/C Ratio(X)	0.69	0.35	0.91	0.71	0.00	0.51	0.48	0.44	0.28	0.49	0.70	0.11
Avail Cap(c_a), veh/h	417	691	530	457	0	579	268	1346	587	384	1358	543
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.7	31.3	38.1	30.4	0.0	33.6	22.3	25.7	23.9	20.8	28.9	22.1
Incr Delay (d2), s/veh	4.8	0.4	16.3	4.9	0.0	0.9	1.4	1.1	1.2	1.0	3.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	4.1	11.5	3.4	0.0	5.2	2.0	6.0	3.1	3.1	11.1	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.5	31.7	54.4	35.2	0.0	34.5	23.7	26.8	25.1	21.8	31.9	22.5
LnGrp LOS	C	C	D	D	A	C	C	C	C	C	C	C
Approach Vol, veh/h		852			549			885			1196	
Approach Delay, s/veh		42.3			34.9			26.0			29.9	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	47.0	15.0	36.9	11.6	47.4	16.0	35.9
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	42.0	10.0	41.0	7.0	42.0	11.0	40.0
Max Q Clear Time (g_c+I1), s	9.0	15.9	12.0	29.9	6.7	27.0	13.0	15.2
Green Ext Time (p_c), s	0.0	5.0	0.0	2.1	0.0	6.2	0.0	1.5

Intersection Summary	
HCM 6th Ctrl Delay	32.7
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	49	3	0	38	0	617	334	101	1055	3
Future Vol, veh/h	0	0	49	3	0	38	0	617	334	101	1055	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	-	-	0	-	-	-	-	-	250	125	-	120
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	68	68	68	68	68	68	68	68	68	68	68	68
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	72	4	0	56	0	907	491	149	1551	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	776	1981	2760	454	-	0	0	1398	0	0
Stage 1	-	-	-	907	907	-	-	-	-	-	-	-
Stage 2	-	-	-	1074	1853	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	7.54	6.54	6.94	-	-	-	4.14	-	-
Critical Hdwy Stg 1	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	3.52	4.02	3.32	-	-	-	2.22	-	-
Pot Cap-1 Maneuver	0	0	340	37	19	553	0	-	-	485	-	-
Stage 1	0	0	-	297	353	-	0	-	-	-	-	-
Stage 2	0	0	-	235	122	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	340	22	13	553	-	-	-	485	-	-
Mov Cap-2 Maneuver	-	-	-	22	13	-	-	-	-	-	-	-
Stage 1	-	-	-	297	353	-	-	-	-	-	-	-
Stage 2	-	-	-	128	85	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.4	30.6	0	1.4
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	340	200	485	-	-
HCM Lane V/C Ratio	-	-	0.212	0.301	0.306	-	-
HCM Control Delay (s)	-	-	18.4	30.6	15.7	-	-
HCM Lane LOS	-	-	C	D	C	-	-
HCM 95th %tile Q(veh)	-	-	0.8	1.2	1.3	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	1	96	5	2	246
Future Vol, veh/h	16	1	96	5	2	246
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	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	1	102	5	2	262

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	371	105	0	0	107	0
Stage 1	105	-	-	-	-	-
Stage 2	266	-	-	-	-	-
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	630	949	-	-	1484	-
Stage 1	919	-	-	-	-	-
Stage 2	779	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	629	949	-	-	1484	-
Mov Cap-2 Maneuver	629	-	-	-	-	-
Stage 1	919	-	-	-	-	-
Stage 2	778	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	642	1484	-
HCM Lane V/C Ratio	-	-	0.028	0.001	-
HCM Control Delay (s)	-	-	10.8	7.4	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	20	20	0	0	20	128	17	0	133	1
Future Vol, veh/h	3	0	20	20	0	0	20	128	17	0	133	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	21	21	0	0	21	136	18	0	141	1
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.3	8	8.2	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	12%	13%	100%	0%
Vol Thru, %	78%	0%	0%	99%
Vol Right, %	10%	87%	0%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	165	23	20	134
LT Vol	20	3	20	0
Through Vol	128	0	0	133
RT Vol	17	20	0	1
Lane Flow Rate	176	24	21	143
Geometry Grp	1	1	1	1
Degree of Util (X)	0.199	0.028	0.029	0.164
Departure Headway (Hd)	4.085	4.153	4.852	4.142
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	871	867	742	857
Service Time	2.148	2.154	2.853	2.212
HCM Lane V/C Ratio	0.202	0.028	0.028	0.167
HCM Control Delay	8.2	7.3	8	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.1	0.1	0.6

Intersection	
Intersection Delay, s/veh	26.4
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	306	284	839	830
Demand Flow Rate, veh/h	311	289	856	847
Vehicles Circulating, veh/h	877	789	361	364
Vehicles Exiting, veh/h	334	428	827	714
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	16.9	13.4	30.8	30.0
Approach LOS	C	B	D	D

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	311	289	856	847
Cap Entry Lane, veh/h	564	617	955	952
Entry HV Adj Factor	0.982	0.982	0.980	0.980
Flow Entry, veh/h	306	284	839	830
Cap Entry, veh/h	554	606	935	933
V/C Ratio	0.551	0.468	0.896	0.890
Control Delay, s/veh	16.9	13.4	30.8	30.0
LOS	C	B	D	D
95th %tile Queue, veh	3	2	13	12

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	370	10	19	267	0	11
Future Vol, veh/h	370	10	19	267	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	220	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	394	11	20	284	0	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	405	0	-	400
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.12	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.218	-	-	3.318
Pot Cap-1 Maneuver	-	-	1154	-	0	650
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1154	-	-	650
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	650	-	-	1154	-
HCM Lane V/C Ratio	0.018	-	-	0.018	-
HCM Control Delay (s)	10.6	-	-	8.2	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	338	44	27	261	25	16
Future Vol, veh/h	338	44	27	261	25	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	220	220	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	360	47	29	278	27	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	407	0	696	360
Stage 1	-	-	-	-	360	-
Stage 2	-	-	-	-	336	-
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	-	-	1152	-	408	684
Stage 1	-	-	-	-	706	-
Stage 2	-	-	-	-	724	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1152	-	398	684
Mov Cap-2 Maneuver	-	-	-	-	398	-
Stage 1	-	-	-	-	706	-
Stage 2	-	-	-	-	706	-

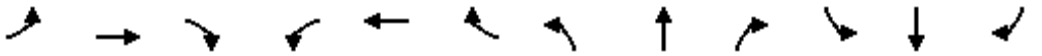
Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	13
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	398	684	-	-	1152	-
HCM Lane V/C Ratio	0.067	0.025	-	-	0.025	-
HCM Control Delay (s)	14.7	10.4	-	-	8.2	-
HCM Lane LOS	B	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	44	94	217	43	97	137	370	36	34	554	52
Future Volume (vph)	44	94	217	43	97	137	370	36	34	554	52
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	10.0	10.0	5.0	10.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	11.0	20.0	20.0	11.0	20.0	11.0	21.0	21.0	11.0	21.0	21.0
Total Split (s)	11.0	31.0	31.0	11.0	31.0	11.0	57.0	57.0	11.0	57.0	57.0
Total Split (%)	10.0%	28.2%	28.2%	10.0%	28.2%	10.0%	51.8%	51.8%	10.0%	51.8%	51.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	15.7	12.9	12.9	15.7	12.9	59.1	56.3	56.3	56.4	51.4	51.4
Actuated g/C Ratio	0.17	0.14	0.14	0.17	0.14	0.63	0.60	0.60	0.60	0.55	0.55
v/c Ratio	0.22	0.39	0.55	0.19	0.57	0.29	0.19	0.04	0.06	0.30	0.06
Control Delay	31.3	42.5	10.7	30.8	42.6	9.1	11.1	0.1	7.7	13.1	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	31.3	42.5	10.7	30.8	42.6	9.1	11.1	0.1	7.7	13.1	0.1
LOS	C	D	B	C	D	A	B	A	A	B	A
Approach Delay		21.7			39.8		9.9			11.8	
Approach LOS		C			D		A			B	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 93.6	
Natural Cycle: 65	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.57	
Intersection Signal Delay: 16.2	Intersection LOS: B
Intersection Capacity Utilization 55.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: CR 7 & CR 10



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	94	217	43	97	42	137	370	36	34	554	52
Future Volume (veh/h)	44	94	217	43	97	42	137	370	36	34	554	52
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	47	100	231	46	103	45	146	394	38	36	589	55
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	252	317	269	264	209	91	481	1864	832	573	1800	803
Arrive On Green	0.04	0.17	0.17	0.04	0.17	0.17	0.05	0.52	0.52	0.03	0.51	0.51
Sat Flow, veh/h	1781	1870	1585	1781	1234	539	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	47	100	231	46	0	148	146	394	38	36	589	55
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1773	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	2.2	4.7	14.3	2.1	0.0	7.6	4.0	6.0	1.2	1.0	9.9	1.8
Cycle Q Clear(g_c), s	2.2	4.7	14.3	2.1	0.0	7.6	4.0	6.0	1.2	1.0	9.9	1.8
Prop In Lane	1.00		1.00	1.00		0.30	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	252	317	269	264	0	300	481	1864	832	573	1800	803
V/C Ratio(X)	0.19	0.32	0.86	0.17	0.00	0.49	0.30	0.21	0.05	0.06	0.33	0.07
Avail Cap(c_a), veh/h	276	464	394	289	0	440	481	1864	832	605	1800	803
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.9	36.7	40.6	32.8	0.0	37.9	11.4	12.8	11.7	11.1	14.7	12.7
Incr Delay (d2), s/veh	0.4	0.6	12.1	0.3	0.0	1.3	0.4	0.3	0.1	0.0	0.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	2.1	6.4	0.9	0.0	3.4	1.4	2.2	0.4	0.4	4.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.3	37.2	52.7	33.1	0.0	39.2	11.8	13.1	11.8	11.1	15.2	12.9
LnGrp LOS	C	D	D	C	A	D	B	B	B	B	B	B
Approach Vol, veh/h		378			194			578			680	
Approach Delay, s/veh		46.2			37.7			12.6			14.8	
Approach LOS		D			D			B			B	

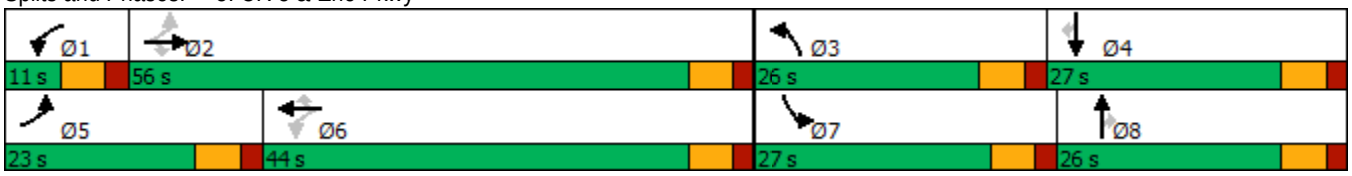
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.2	58.8	9.6	23.1	11.0	57.0	9.7	23.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	51.0	5.0	25.0	5.0	51.0	5.0	25.0
Max Q Clear Time (g_c+I1), s	3.0	8.0	4.1	16.3	6.0	11.9	4.2	9.6
Green Ext Time (p_c), s	0.0	2.6	0.0	0.8	0.0	4.8	0.0	0.6

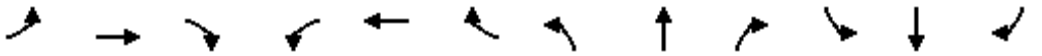
Intersection Summary	
HCM 6th Ctrl Delay	23.0
HCM 6th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	296	1457	399	96	931	499	322	417	161	416	298	200
Future Volume (vph)	296	1457	399	96	931	499	322	417	161	416	298	200
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	25.0	25.0	5.0	25.0	25.0	5.0	8.0	8.0	5.0	8.0	8.0
Minimum Split (s)	11.0	31.0	31.0	11.0	31.0	31.0	11.0	14.0	14.0	11.0	14.0	14.0
Total Split (s)	23.0	56.0	56.0	11.0	44.0	44.0	26.0	26.0	26.0	27.0	27.0	27.0
Total Split (%)	19.2%	46.7%	46.7%	9.2%	36.7%	36.7%	21.7%	21.7%	21.7%	22.5%	22.5%	22.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	-3.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	3.0	6.0	6.0	3.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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)	61.2	53.1	50.1	43.1	41.1	38.1	15.4	17.4	17.4	18.0	20.0	20.0
Actuated g/C Ratio	0.53	0.46	0.44	0.38	0.36	0.33	0.13	0.15	0.15	0.16	0.17	0.17
v/c Ratio	0.94	0.93	0.48	0.70	0.76	0.62	0.73	0.81	0.42	0.80	0.50	0.47
Control Delay	68.1	40.5	8.8	46.2	38.1	8.5	57.4	59.8	7.5	59.1	46.3	9.4
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	68.1	40.5	8.8	46.2	38.1	8.5	57.4	59.8	7.5	59.1	46.3	9.4
LOS	E	D	A	D	D	A	E	E	A	E	D	A
Approach Delay		38.4			28.9			49.5			44.0	
Approach LOS		D			C			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 114.6	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 38.5	Intersection LOS: D
Intersection Capacity Utilization 87.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: CR 5 & Erie Pkwy





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	296	1457	399	96	931	499	322	417	161	416	298	200
Future Volume (veh/h)	296	1457	399	96	931	499	322	417	161	416	298	200
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	308	1518	416	100	970	520	335	434	168	433	310	208
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	337	1693	712	158	1412	587	402	517	231	499	617	275
Arrive On Green	0.12	0.48	0.45	0.04	0.40	0.37	0.12	0.15	0.15	0.14	0.17	0.17
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	3554	1585	3456	3554	1585
Grp Volume(v), veh/h	308	1518	416	100	970	520	335	434	168	433	310	208
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1777	1585	1728	1777	1585
Q Serve(g_s), s	11.6	43.4	21.8	3.9	25.2	34.2	10.6	13.2	11.3	13.6	8.8	13.9
Cycle Q Clear(g_c), s	11.6	43.4	21.8	3.9	25.2	34.2	10.6	13.2	11.3	13.6	8.8	13.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	337	1693	712	158	1412	587	402	517	231	499	617	275
V/C Ratio(X)	0.92	0.90	0.58	0.63	0.69	0.89	0.83	0.84	0.73	0.87	0.50	0.76
Avail Cap(c_a), veh/h	388	1693	712	158	1412	587	621	639	285	652	671	299
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.9	26.6	22.9	27.3	27.8	32.8	48.1	46.3	45.4	46.5	41.6	43.7
Incr Delay (d2), s/veh	22.5	7.9	3.5	6.1	2.7	17.7	3.3	6.8	4.9	7.9	0.2	8.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.5	18.3	8.3	1.8	10.4	15.2	4.6	6.1	4.6	6.2	3.7	5.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.5	34.5	26.4	33.4	30.6	50.6	51.4	53.1	50.4	54.5	41.9	52.0
LnGrp LOS	D	C	C	C	C	D	D	D	D	D	D	D
Approach Vol, veh/h		2242			1590			937			951	
Approach Delay, s/veh		34.7			37.3			52.0			49.8	
Approach LOS		C			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	56.0	18.9	25.3	19.8	47.2	22.1	22.2
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	50.0	20.0	21.0	17.0	38.0	21.0	20.0
Max Q Clear Time (g_c+I1), s	5.9	45.4	12.6	15.9	13.6	36.2	15.6	15.2
Green Ext Time (p_c), s	0.0	4.1	0.4	0.8	0.2	1.5	0.4	1.0

Intersection Summary	
HCM 6th Ctrl Delay	40.7
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱	↰	↑↑	↱			↱			↱
Traffic Vol, veh/h	0	1960	75	89	1483	17	0	0	80	0	0	42
Future Vol, veh/h	0	1960	75	89	1483	17	0	0	80	0	0	42
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	-	-	220	110	-	220	-	-	0	-	-	0
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	0	2085	80	95	1578	18	0	0	85	0	0	45

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	2165	0	0	-	-	1043	-	-	789
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	4.14	-	-	-	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	2.22	-	-	-	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	244	-	-	0	0	226	0	0	333
Stage 1	0	-	-	-	-	-	0	0	-	0	0	-
Stage 2	0	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	244	-	-	-	-	226	-	-	333
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

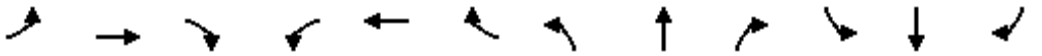
Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.6	30.2	17.5
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	226	-	-	244	-	-	333
HCM Lane V/C Ratio	0.377	-	-	0.388	-	-	0.134
HCM Control Delay (s)	30.2	-	-	28.8	-	-	17.5
HCM Lane LOS	D	-	-	D	-	-	C
HCM 95th %tile Q(veh)	1.7	-	-	1.7	-	-	0.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	148	1740	152	100	1412	161	116	0	106	0
Future Volume (vph)	148	1740	152	100	1412	161	116	0	106	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6		3	8	7	4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	7	4
Switch Phase										
Minimum Initial (s)	5.0	25.0	25.0	5.0	25.0	25.0	5.0	8.0	5.0	8.0
Minimum Split (s)	11.0	31.0	31.0	11.0	31.0	31.0	11.0	20.0	11.0	20.0
Total Split (s)	11.0	64.0	64.0	11.0	64.0	64.0	11.0	25.0	11.0	25.0
Total Split (%)	9.9%	57.7%	57.7%	9.9%	57.7%	57.7%	9.9%	22.5%	9.9%	22.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	Max	None	Max
Act Effct Green (s)	63.0	58.0	58.0	63.0	58.0	58.0	24.0	19.0	24.0	19.0
Actuated g/C Ratio	0.57	0.52	0.52	0.57	0.52	0.52	0.22	0.17	0.22	0.17
v/c Ratio	1.07	1.00	0.18	0.72	0.81	0.19	0.40	0.27	0.38	0.17
Control Delay	117.3	48.2	3.4	43.3	26.5	3.7	38.0	4.3	37.4	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	117.3	48.2	3.4	43.3	26.5	3.7	38.0	4.3	37.4	0.9
LOS	F	D	A	D	C	A	D	A	D	A
Approach Delay		49.9			25.3			22.4		23.9
Approach LOS		D			C			C		C

Intersection Summary	
Cycle Length: 111	
Actuated Cycle Length: 111	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.07	
Intersection Signal Delay: 37.3	Intersection LOS: D
Intersection Capacity Utilization 81.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 7: Major N/S Collector & Erie Pkwy



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	1740	152	100	1412	161	116	0	101	106	0	62
Future Volume (veh/h)	148	1740	152	100	1412	161	116	0	101	106	0	62
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	157	1851	162	106	1502	171	123	0	107	113	0	66
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	196	1862	830	144	1857	828	326	0	271	288	0	271
Arrive On Green	0.05	0.52	0.52	0.04	0.52	0.52	0.05	0.00	0.17	0.05	0.00	0.17
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	0	1585	1781	0	1585
Grp Volume(v), veh/h	157	1851	162	106	1502	171	123	0	107	113	0	66
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	0	1585	1781	0	1585
Q Serve(g_s), s	4.6	57.5	6.0	3.0	38.8	6.4	5.0	0.0	6.7	5.0	0.0	4.0
Cycle Q Clear(g_c), s	4.6	57.5	6.0	3.0	38.8	6.4	5.0	0.0	6.7	5.0	0.0	4.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	196	1862	830	144	1857	828	326	0	271	288	0	271
V/C Ratio(X)	0.80	0.99	0.20	0.74	0.81	0.21	0.38	0.00	0.39	0.39	0.00	0.24
Avail Cap(c_a), veh/h	196	1862	830	146	1857	828	326	0	271	288	0	271
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.4	26.3	14.0	26.3	21.9	14.2	37.5	0.0	40.9	37.5	0.0	39.8
Incr Delay (d2), s/veh	20.5	19.6	0.5	17.2	3.9	0.6	0.7	0.0	4.3	0.9	0.0	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	26.1	2.2	2.0	15.2	2.4	0.6	0.0	2.9	0.4	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.9	45.8	14.5	43.5	25.8	14.7	38.3	0.0	45.1	38.4	0.0	41.9
LnGrp LOS	D	D	B	D	C	B	D	A	D	D	A	D
Approach Vol, veh/h		2170			1779			230			179	
Approach Delay, s/veh		43.4			25.8			41.5			39.7	
Approach LOS		D			C			D			D	

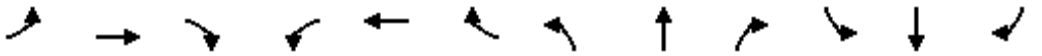
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.9	64.1	11.0	25.0	11.0	64.0	11.0	25.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	58.0	5.0	19.0	5.0	58.0	5.0	19.0
Max Q Clear Time (g_c+I1), s	5.0	59.5	7.0	6.0	6.6	40.8	7.0	8.7
Green Ext Time (p_c), s	0.0	0.0	0.0	0.2	0.0	10.0	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	35.9
HCM 6th LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	210	1568	168	122	1324	178	175	0	187	0
Future Volume (vph)	210	1568	168	122	1324	178	175	0	187	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6		3	8	7	4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	3	8	7	4
Switch Phase										
Minimum Initial (s)	5.0	25.0	25.0	5.0	25.0	25.0	5.0	8.0	5.0	8.0
Minimum Split (s)	11.0	31.0	31.0	11.0	31.0	31.0	11.0	20.0	11.0	20.0
Total Split (s)	15.0	58.0	58.0	11.0	54.0	54.0	16.0	26.0	15.0	25.0
Total Split (%)	13.6%	52.7%	52.7%	10.0%	49.1%	49.1%	14.5%	23.6%	13.6%	22.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None
Act Effct Green (s)	61.1	52.1	52.1	53.1	48.1	48.1	23.6	13.8	21.9	12.9
Actuated g/C Ratio	0.59	0.50	0.50	0.51	0.46	0.46	0.23	0.13	0.21	0.12
v/c Ratio	0.99	0.94	0.21	0.83	0.86	0.23	0.70	0.79	0.88	0.56
Control Delay	85.4	37.1	4.6	57.9	32.4	5.8	45.8	36.1	70.0	17.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.4	37.1	4.6	57.9	32.4	5.8	45.8	36.1	70.0	17.9
LOS	F	D	A	E	C	A	D	D	E	B
Approach Delay		39.5			31.4			40.1		45.0
Approach LOS		D			C			D		D

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 103.9	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 37.0	Intersection LOS: D
Intersection Capacity Utilization 96.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 8: Minor N/S Collector & Erie Pkwy



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	1568	168	122	1324	178	175	0	251	187	0	173
Future Volume (veh/h)	210	1568	168	122	1324	178	175	0	251	187	0	173
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	223	1668	179	130	1409	189	186	0	267	199	0	184
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	232	1680	749	148	1551	692	304	0	288	229	0	274
Arrive On Green	0.08	0.47	0.47	0.05	0.44	0.44	0.09	0.00	0.18	0.08	0.00	0.17
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	0	1585	1781	0	1585
Grp Volume(v), veh/h	223	1668	179	130	1409	189	186	0	267	199	0	184
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	0	1585	1781	0	1585
Q Serve(g_s), s	8.3	51.3	7.4	4.5	40.7	8.4	9.4	0.0	18.2	9.0	0.0	12.0
Cycle Q Clear(g_c), s	8.3	51.3	7.4	4.5	40.7	8.4	9.4	0.0	18.2	9.0	0.0	12.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	232	1680	749	148	1551	692	304	0	288	229	0	274
V/C Ratio(X)	0.96	0.99	0.24	0.88	0.91	0.27	0.61	0.00	0.93	0.87	0.00	0.67
Avail Cap(c_a), veh/h	232	1680	749	148	1551	692	304	0	288	229	0	274
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.7	28.8	17.2	26.4	29.0	19.8	34.1	0.0	44.3	37.7	0.0	42.6
Incr Delay (d2), s/veh	47.8	20.3	0.8	40.7	9.4	1.0	3.6	0.0	34.2	28.0	0.0	6.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	24.1	2.8	3.4	17.7	3.3	4.4	0.0	9.8	6.2	0.0	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	75.5	49.2	18.0	67.1	38.3	20.8	37.6	0.0	78.5	65.7	0.0	48.9
LnGrp LOS	E	D	B	E	D	C	D	A	E	E	A	D
Approach Vol, veh/h		2070			1728			453			383	
Approach Delay, s/veh		49.3			38.6			61.7			57.6	
Approach LOS		D			D			E			E	

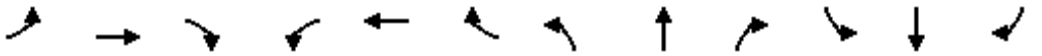
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	58.0	16.0	25.0	15.0	54.0	15.0	26.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	52.0	10.0	19.0	9.0	48.0	9.0	20.0
Max Q Clear Time (g_c+I1), s	6.5	53.3	11.4	14.0	10.3	42.7	11.0	20.2
Green Ext Time (p_c), s	0.0	0.0	0.0	0.4	0.0	3.8	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	47.2
HCM 6th LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	244	1621	140	188	1191	249	190	410	73	426	369	243
Future Volume (vph)	244	1621	140	188	1191	249	190	410	73	426	369	243
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		2	6		6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0
Minimum Split (s)	10.0	16.3	16.3	10.0	16.3	16.3	10.8	16.8	16.8	10.0	16.8	10.0
Total Split (s)	17.0	56.0	56.0	14.0	53.0	53.0	18.0	22.0	22.0	18.0	22.0	17.0
Total Split (%)	15.5%	50.9%	50.9%	12.7%	48.2%	48.2%	16.4%	20.0%	20.0%	16.4%	20.0%	15.5%
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.5	3.0	4.0	4.0	3.0	4.0	3.0
All-Red Time (s)	2.0	2.8	2.8	2.0	2.8	2.8	2.8	2.8	2.8	2.0	2.8	2.0
Lost Time Adjust (s)	-2.0	-3.0	0.0	0.0	-3.0	0.0	-2.0	-2.0	0.0	-2.0	-2.0	0.0
Total Lost Time (s)	3.0	3.3	6.3	5.0	3.3	6.3	3.8	4.8	6.8	3.0	4.8	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead
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)	66.8	52.7	49.7	57.2	49.9	46.9	14.2	16.9	14.9	15.0	16.9	33.5
Actuated g/C Ratio	0.61	0.48	0.45	0.52	0.45	0.43	0.13	0.15	0.14	0.14	0.15	0.31
v/c Ratio	0.86	0.99	0.18	0.92	0.77	0.32	0.86	0.78	0.23	0.95	0.70	0.46
Control Delay	54.2	49.5	3.6	69.9	29.3	5.4	80.9	55.7	1.6	77.9	51.8	22.5
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	54.2	49.5	3.6	69.9	29.3	5.4	80.9	55.7	1.6	77.9	51.8	22.5
LOS	D	D	A	E	C	A	F	E	A	E	D	C
Approach Delay		46.8			30.3			57.0			55.6	
Approach LOS		D			C			E			E	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 109.7	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 44.8	Intersection LOS: D
Intersection Capacity Utilization 93.5%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 9: CR 7 & Erie Pkwy



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	244	1621	140	188	1191	249	190	410	73	426	369	243
Future Volume (veh/h)	244	1621	140	188	1191	249	190	410	73	426	369	243
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	254	1689	146	196	1241	259	198	427	76	444	384	253
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	322	1703	716	211	1670	702	230	556	219	471	556	363
Arrive On Green	0.11	0.48	0.45	0.08	0.47	0.44	0.13	0.16	0.14	0.14	0.16	0.14
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	3554	1585	3456	3554	1585
Grp Volume(v), veh/h	254	1689	146	196	1241	259	198	427	76	444	384	253
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1777	1585	1728	1777	1585
Q Serve(g_s), s	7.9	51.9	6.1	7.9	31.3	12.0	12.0	12.7	4.8	14.0	11.2	15.2
Cycle Q Clear(g_c), s	7.9	51.9	6.1	7.9	31.3	12.0	12.0	12.7	4.8	14.0	11.2	15.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	322	1703	716	211	1670	702	230	556	219	471	556	363
V/C Ratio(X)	0.79	0.99	0.20	0.93	0.74	0.37	0.86	0.77	0.35	0.94	0.69	0.70
Avail Cap(c_a), veh/h	354	1703	716	211	1670	702	230	556	219	471	556	363
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.2	28.4	18.2	31.2	23.8	20.4	46.9	44.5	42.9	47.1	43.9	38.9
Incr Delay (d2), s/veh	10.5	20.0	0.6	42.3	3.0	1.5	26.6	6.4	0.9	27.5	3.6	5.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	24.2	2.2	5.6	12.5	4.5	6.8	5.9	1.9	7.6	5.1	6.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.7	48.5	18.8	73.5	26.8	21.9	73.5	50.9	43.8	74.6	47.5	44.6
LnGrp LOS	C	D	B	E	C	C	E	D	D	E	D	D
Approach Vol, veh/h		2089			1696			701			1081	
Approach Delay, s/veh		44.3			31.4			56.6			58.0	
Approach LOS		D			C			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	56.0	18.0	22.0	15.0	55.0	18.0	22.0
Change Period (Y+Rc), s	5.0	* 6.3	* 5.8	* 6.8	5.0	* 6.3	5.0	* 6.8
Max Green Setting (Gmax), s	9.0	* 50	* 12	* 15	12.0	* 47	13.0	* 15
Max Q Clear Time (g_c+I1), s	9.9	53.9	14.0	17.2	9.9	33.3	16.0	14.7
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.2	7.3	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	44.6
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	15	731	51	20	708
Future Vol, veh/h	0	15	731	51	20	708
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	-	220	220	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	16	778	54	21	753

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	778	0	0	832	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	4.12	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	0	396	-	-	801	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	396	-	-	801	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

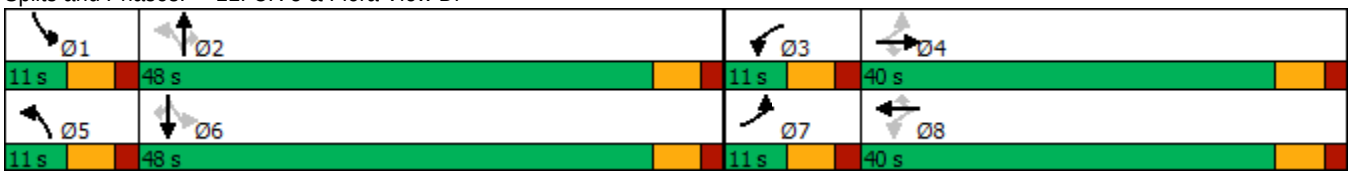
Approach	WB	NB	SB
HCM Control Delay, s	14.5	0	0.3
HCM LOS	B		

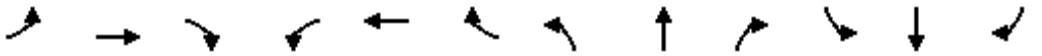
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	396	801	-
HCM Lane V/C Ratio	-	-	0.04	0.027	-
HCM Control Delay (s)	-	-	14.5	9.6	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	40	106	81	45	163	140	606	83	140	548	20
Future Volume (vph)	13	40	106	81	45	163	140	606	83	140	548	20
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	25.0	25.0	5.0	25.0	25.0
Minimum Split (s)	11.0	40.0	40.0	11.0	40.0	40.0	11.0	36.0	36.0	11.0	36.0	36.0
Total Split (s)	11.0	40.0	40.0	11.0	40.0	40.0	11.0	48.0	48.0	11.0	48.0	48.0
Total Split (%)	10.0%	36.4%	36.4%	10.0%	36.4%	36.4%	10.0%	43.6%	43.6%	10.0%	43.6%	43.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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	None	None	None	None	None	None	Max	Max	None	Max	Max
Act Effct Green (s)	14.2	10.3	10.3	17.7	16.7	16.7	47.1	42.1	42.1	47.1	42.1	42.1
Actuated g/C Ratio	0.17	0.12	0.12	0.21	0.20	0.20	0.56	0.50	0.50	0.56	0.50	0.50
v/c Ratio	0.06	0.19	0.35	0.31	0.13	0.38	0.42	0.69	0.10	0.48	0.62	0.02
Control Delay	25.5	36.5	6.2	29.8	30.2	8.3	11.1	21.6	0.7	12.9	19.7	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	0.0
Total Delay	25.5	36.5	6.2	29.8	30.2	8.3	11.1	21.6	0.7	12.9	19.7	0.1
LOS	C	D	A	C	C	A	B	C	A	B	B	A
Approach Delay		15.4			17.7			17.8			17.8	
Approach LOS		B			B			B			B	

Intersection Summary		
Cycle Length: 110		
Actuated Cycle Length: 84		
Natural Cycle: 100		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.69		
Intersection Signal Delay: 17.6	Intersection LOS: B	
Intersection Capacity Utilization 65.8%	ICU Level of Service C	
Analysis Period (min) 15		

Splits and Phases: 11: CR 5 & Flora View Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	40	106	81	45	163	140	606	83	140	548	20
Future Volume (veh/h)	13	40	106	81	45	163	140	606	83	140	548	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	14	43	113	86	48	173	149	645	88	149	583	21
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	248	218	185	303	293	248	398	915	775	347	915	775
Arrive On Green	0.02	0.12	0.12	0.06	0.16	0.16	0.06	0.49	0.49	0.06	0.49	0.49
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	14	43	113	86	48	173	149	645	88	149	583	21
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.6	1.8	5.8	3.6	1.9	8.9	3.5	23.1	2.6	3.5	19.9	0.6
Cycle Q Clear(g_c), s	0.6	1.8	5.8	3.6	1.9	8.9	3.5	23.1	2.6	3.5	19.9	0.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	248	218	185	303	293	248	398	915	775	347	915	775
V/C Ratio(X)	0.06	0.20	0.61	0.28	0.16	0.70	0.37	0.71	0.11	0.43	0.64	0.03
Avail Cap(c_a), veh/h	323	740	628	305	740	628	398	915	775	347	915	775
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.5	34.3	36.1	30.9	31.3	34.3	12.4	17.1	11.9	13.5	16.3	11.4
Incr Delay (d2), s/veh	0.1	0.4	3.3	0.5	0.3	3.5	0.6	4.6	0.3	0.8	3.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.8	2.4	1.6	0.9	3.6	1.2	9.6	0.9	1.2	8.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.6	34.8	39.4	31.4	31.6	37.8	13.0	21.7	12.2	14.4	19.7	11.4
LnGrp LOS	C	C	D	C	C	D	B	C	B	B	B	B
Approach Vol, veh/h		170			307			882			753	
Approach Delay, s/veh		37.6			35.0			19.3			18.4	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	48.0	10.9	16.0	11.0	48.0	7.4	19.5
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	42.0	5.0	34.0	5.0	42.0	5.0	34.0
Max Q Clear Time (g_c+I1), s	5.5	25.1	5.6	7.8	5.5	21.9	2.6	10.9
Green Ext Time (p_c), s	0.0	3.9	0.0	0.6	0.0	3.4	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	22.7
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1	2	534	804	1
Future Vol, veh/h	0	1	2	534	804	1
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	-	220	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	2	568	855	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1144	428	856	0	-	0
Stage 1	856	-	-	-	-	-
Stage 2	288	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	193	575	780	-	-	-
Stage 1	377	-	-	-	-	-
Stage 2	735	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	192	575	780	-	-	-
Mov Cap-2 Maneuver	192	-	-	-	-	-
Stage 1	376	-	-	-	-	-
Stage 2	735	-	-	-	-	-

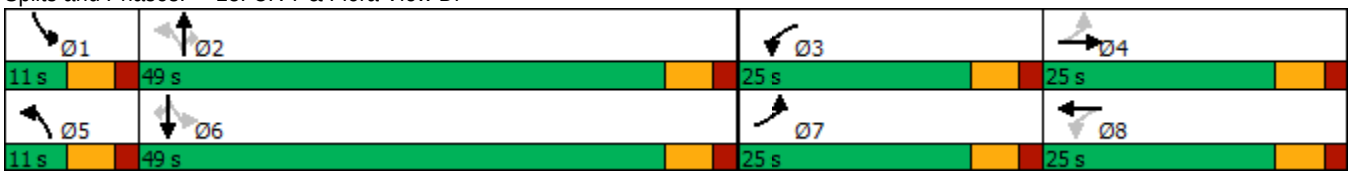
Approach	EB	NB	SB
HCM Control Delay, s	11.3	0	0
HCM LOS	B		

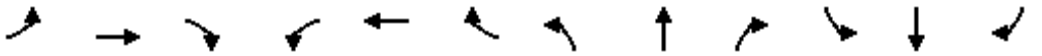
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	780	-	575	-	-
HCM Lane V/C Ratio	0.003	-	0.002	-	-
HCM Control Delay (s)	9.6	-	11.3	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	65	100	353	150	31	418	403	79	687	21
Future Volume (vph)	65	100	353	150	31	418	403	79	687	21
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	11.0	20.0	11.0	20.0	11.0	21.0	21.0	11.0	21.0	21.0
Total Split (s)	25.0	25.0	25.0	25.0	11.0	49.0	49.0	11.0	49.0	49.0
Total Split (%)	22.7%	22.7%	22.7%	22.7%	10.0%	44.5%	44.5%	10.0%	44.5%	44.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Max	Max	None	Max	Max
Act Effct Green (s)	20.7	12.7	36.6	25.3	47.1	43.3	43.3	48.3	45.5	45.5
Actuated g/C Ratio	0.21	0.13	0.36	0.25	0.47	0.43	0.43	0.48	0.45	0.45
v/c Ratio	0.24	0.55	0.80	0.48	0.10	0.29	0.46	0.19	0.46	0.03
Control Delay	25.1	48.4	41.0	36.2	13.9	20.5	3.9	14.5	21.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.1	48.4	41.0	36.2	13.9	20.5	3.9	14.5	21.7	0.0
LOS	C	D	D	D	B	C	A	B	C	A
Approach Delay		40.3		39.2		12.4			20.4	
Approach LOS		D		D		B			C	

Intersection Summary		
Cycle Length: 110		
Actuated Cycle Length: 100.5		
Natural Cycle: 65		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.80		
Intersection Signal Delay: 23.5	Intersection LOS: C	
Intersection Capacity Utilization 71.0%	ICU Level of Service C	
Analysis Period (min) 15		

Splits and Phases: 13: CR 7 & Flora View Dr





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	100	22	353	150	58	31	418	403	79	687	21
Future Volume (veh/h)	65	100	22	353	150	58	31	418	403	79	687	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	69	106	23	376	160	62	33	445	429	84	731	22
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	271	148	32	447	310	120	337	1520	678	479	1574	702
Arrive On Green	0.05	0.10	0.10	0.19	0.24	0.24	0.03	0.43	0.43	0.04	0.44	0.44
Sat Flow, veh/h	1781	1489	323	1781	1283	497	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	69	0	129	376	0	222	33	445	429	84	731	22
Grp Sat Flow(s),veh/h/ln	1781	0	1812	1781	0	1781	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	3.5	0.0	6.9	18.6	0.0	10.9	1.0	8.2	21.3	2.6	14.5	0.8
Cycle Q Clear(g_c), s	3.5	0.0	6.9	18.6	0.0	10.9	1.0	8.2	21.3	2.6	14.5	0.8
Prop In Lane	1.00		0.18	1.00		0.28	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	271	0	180	447	0	430	337	1520	678	479	1574	702
V/C Ratio(X)	0.25	0.00	0.72	0.84	0.00	0.52	0.10	0.29	0.63	0.18	0.46	0.03
Avail Cap(c_a), veh/h	524	0	343	447	0	430	372	1520	678	487	1574	702
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.1	0.0	43.9	31.0	0.0	33.1	15.9	18.8	22.6	15.0	19.6	15.8
Incr Delay (d2), s/veh	0.5	0.0	5.2	13.5	0.0	1.1	0.1	0.5	4.5	0.2	1.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	3.4	9.5	0.0	4.8	0.4	3.3	8.5	1.0	5.7	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.6	0.0	49.1	44.6	0.0	34.1	16.1	19.3	27.0	15.2	20.6	15.9
LnGrp LOS	D	A	D	D	A	C	B	B	C	B	C	B
Approach Vol, veh/h		198			598			907			837	
Approach Delay, s/veh		45.4			40.7			22.8			20.0	
Approach LOS		D			D			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.5	49.0	25.0	16.0	9.0	50.5	10.8	30.2
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	43.0	19.0	19.0	5.0	43.0	19.0	19.0
Max Q Clear Time (g_c+I1), s	4.6	23.3	20.6	8.9	3.0	16.5	5.5	12.9
Green Ext Time (p_c), s	0.0	4.1	0.0	0.4	0.0	4.9	0.1	0.6

Intersection Summary	
HCM 6th Ctrl Delay	27.9
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	15	22	852	1047	14
Future Vol, veh/h	0	15	22	852	1047	14
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	220	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	16	23	906	1114	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	565	1129	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	468	615	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	468	615	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	615	-	468	-	-
HCM Lane V/C Ratio	0.038	-	0.034	-	-
HCM Control Delay (s)	11.1	-	13	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	26	29	874	1011	50
Future Vol, veh/h	0	26	29	874	1011	50
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	220	-	-	220
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	28	31	930	1076	53

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	538	1129	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	488	615	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	488	615	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.8	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	615	-	488	-	-
HCM Lane V/C Ratio	0.05	-	0.057	-	-
HCM Control Delay (s)	11.2	-	12.8	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	4.6
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	191	230	169	107
Demand Flow Rate, veh/h	195	234	172	109
Vehicles Circulating, veh/h	116	159	178	256
Vehicles Exiting, veh/h	249	191	133	137
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.4	4.9	4.5	4.4
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	195	234	172	109
Cap Entry Lane, veh/h	1226	1173	1151	1063
Entry HV Adj Factor	0.979	0.983	0.981	0.983
Flow Entry, veh/h	191	230	169	107
Cap Entry, veh/h	1200	1153	1129	1045
V/C Ratio	0.159	0.199	0.149	0.103
Control Delay, s/veh	4.4	4.9	4.5	4.4
LOS	A	A	A	A
95th %tile Queue, veh	1	1	1	0

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	144	20	9	191	16	38
Future Vol, veh/h	144	20	9	191	16	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	153	21	10	203	17	40

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	174	0	387	164
Stage 1	-	-	-	-	164	-
Stage 2	-	-	-	-	223	-
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	-	-	1403	-	616	881
Stage 1	-	-	-	-	865	-
Stage 2	-	-	-	-	814	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1403	-	612	881
Mov Cap-2 Maneuver	-	-	-	-	612	-
Stage 1	-	-	-	-	865	-
Stage 2	-	-	-	-	808	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	612	881	-	-	1403	-
HCM Lane V/C Ratio	0.028	0.046	-	-	0.007	-
HCM Control Delay (s)	11.1	9.3	-	-	7.6	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	48	20	809	42	13	723
Future Vol, veh/h	48	20	809	42	13	723
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	-	-	0	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	22	889	46	14	795

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1315	445	0	0	935	0
Stage 1	889	-	-	-	-	-
Stage 2	426	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	149	561	-	-	728	-
Stage 1	362	-	-	-	-	-
Stage 2	627	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	146	561	-	-	728	-
Mov Cap-2 Maneuver	146	-	-	-	-	-
Stage 1	362	-	-	-	-	-
Stage 2	615	-	-	-	-	-

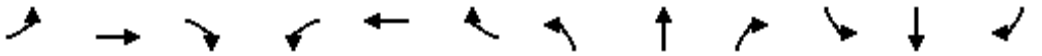
Approach	WB	NB	SB
HCM Control Delay, s	36.5	0	0.2
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	187	728	-
HCM Lane V/C Ratio	-	-	0.4	0.02	-
HCM Control Delay (s)	-	-	36.5	10	-
HCM Lane LOS	-	-	E	B	-
HCM 95th %tile Q(veh)	-	-	1.8	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	39	5	116	55	13	184	785	21	42	685	44
Future Volume (vph)	39	5	116	55	13	184	785	21	42	685	44
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	20.0	20.0	10.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0
Total Split (s)	12.0	30.0	30.0	12.0	30.0	12.0	66.0	66.0	12.0	66.0	66.0
Total Split (%)	10.0%	25.0%	25.0%	10.0%	25.0%	10.0%	55.0%	55.0%	10.0%	55.0%	55.0%
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)	12.5	7.1	7.1	13.6	9.5	70.6	66.6	66.6	67.5	61.2	61.2
Actuated g/C Ratio	0.13	0.07	0.07	0.14	0.10	0.71	0.67	0.67	0.68	0.61	0.61
v/c Ratio	0.21	0.04	0.55	0.30	0.23	0.40	0.36	0.02	0.10	0.34	0.05
Control Delay	37.2	44.2	17.8	38.8	25.4	7.3	9.5	0.0	5.3	10.7	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	37.2	44.2	17.8	38.8	25.4	7.3	9.5	0.0	5.3	10.7	0.1
LOS	D	D	B	D	C	A	A	A	A	B	A
Approach Delay		23.3			33.2		8.9			9.8	
Approach LOS		C			C		A			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 99.8	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 11.5	Intersection LOS: B
Intersection Capacity Utilization 51.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 21: CR 5 & Colliers Pkwy/Erie HS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	5	116	55	13	27	184	785	21	42	685	44
Future Volume (veh/h)	39	5	116	55	13	27	184	785	21	42	685	44
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	5	126	60	14	29	200	853	23	46	745	48
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	245	188	159	266	58	120	520	2227	993	457	2132	951
Arrive On Green	0.03	0.10	0.10	0.04	0.11	0.11	0.06	0.63	0.63	0.04	0.60	0.60
Sat Flow, veh/h	1781	1870	1585	1781	543	1125	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	42	5	126	60	0	43	200	853	23	46	745	48
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1668	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	2.1	0.2	7.9	3.0	0.0	2.4	4.3	12.0	0.6	1.0	10.8	1.3
Cycle Q Clear(g_c), s	2.1	0.2	7.9	3.0	0.0	2.4	4.3	12.0	0.6	1.0	10.8	1.3
Prop In Lane	1.00		1.00	1.00		0.67	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	245	188	159	266	0	178	520	2227	993	457	2132	951
V/C Ratio(X)	0.17	0.03	0.79	0.23	0.00	0.24	0.38	0.38	0.02	0.10	0.35	0.05
Avail Cap(c_a), veh/h	307	460	390	317	0	410	531	2227	993	515	2132	951
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.0	41.3	44.7	38.8	0.0	41.6	7.3	9.3	7.2	7.4	10.3	8.4
Incr Delay (d2), s/veh	0.3	0.1	8.6	0.4	0.0	0.7	0.5	0.5	0.0	0.1	0.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.1	3.5	1.4	0.0	1.0	1.4	4.1	0.2	0.3	3.8	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.4	41.3	53.3	39.3	0.0	42.3	7.8	9.8	7.2	7.5	10.7	8.5
LnGrp LOS	D	D	D	D	A	D	A	A	A	A	B	A
Approach Vol, veh/h		173			103			1076			839	
Approach Delay, s/veh		49.6			40.5			9.4			10.4	
Approach LOS		D			D			A			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	68.7	9.1	15.2	11.4	66.0	8.5	15.9
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	61.0	7.0	25.0	7.0	61.0	7.0	25.0
Max Q Clear Time (g_c+I1), s	3.0	14.0	5.0	9.9	6.3	12.8	4.1	4.4
Green Ext Time (p_c), s	0.0	6.5	0.0	0.3	0.0	5.6	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	14.4
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	29	14	0	3	0	1017	195	18	872	10
Future Vol, veh/h	0	0	29	14	0	3	0	1017	195	18	872	10
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	-	-	0	-	-	-	-	-	250	125	-	120
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	0	0	34	16	0	3	0	1183	227	21	1014	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	507	1732	2251	592	-	0	0	1410	0	0
Stage 1	-	-	-	1183	1183	-	-	-	-	-	-	-
Stage 2	-	-	-	549	1068	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	7.54	6.54	6.94	-	-	-	4.14	-	-
Critical Hdwy Stg 1	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	3.52	4.02	3.32	-	-	-	2.22	-	-
Pot Cap-1 Maneuver	0	0	511	56	41	449	0	-	-	480	-	-
Stage 1	0	0	-	201	261	-	0	-	-	-	-	-
Stage 2	0	0	-	488	296	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	511	51	39	449	-	-	-	480	-	-
Mov Cap-2 Maneuver	-	-	-	51	39	-	-	-	-	-	-	-
Stage 1	-	-	-	201	261	-	-	-	-	-	-	-
Stage 2	-	-	-	436	283	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.5	92.1	0	0.3
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	511	60	480	-	-
HCM Lane V/C Ratio	-	-	0.066	0.329	0.044	-	-
HCM Control Delay (s)	-	-	12.5	92.1	12.8	-	-
HCM Lane LOS	-	-	B	F	B	-	-
HCM 95th %tile Q(veh)	-	-	0.2	1.2	0.1	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	3	294	14	3	157
Future Vol, veh/h	10	3	294	14	3	157
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	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	3	313	15	3	167

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	494	321	0	0	328	0
Stage 1	321	-	-	-	-	-
Stage 2	173	-	-	-	-	-
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	535	720	-	-	1232	-
Stage 1	735	-	-	-	-	-
Stage 2	857	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	534	720	-	-	1232	-
Mov Cap-2 Maneuver	534	-	-	-	-	-
Stage 1	735	-	-	-	-	-
Stage 2	855	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.5	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	568	1232	-
HCM Lane V/C Ratio	-	-	0.024	0.003	-
HCM Control Delay (s)	-	-	11.5	7.9	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	37	32	0	0	49	296	43	0	290	4
Future Vol, veh/h	3	0	37	32	0	0	49	296	43	0	290	4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	39	34	0	0	52	315	46	0	309	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

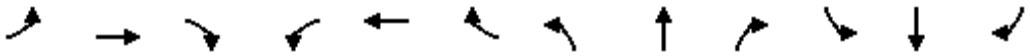
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.4	9.2	12	10.6
HCM LOS	A	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	13%	7%	100%	0%
Vol Thru, %	76%	0%	0%	99%
Vol Right, %	11%	93%	0%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	388	40	32	294
LT Vol	49	3	32	0
Through Vol	296	0	0	290
RT Vol	43	37	0	4
Lane Flow Rate	413	43	34	313
Geometry Grp	1	1	1	1
Degree of Util (X)	0.508	0.059	0.055	0.396
Departure Headway (Hd)	4.433	5.032	5.789	4.563
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	813	707	615	788
Service Time	2.464	3.097	3.855	2.597
HCM Lane V/C Ratio	0.508	0.061	0.055	0.397
HCM Control Delay	12	8.4	9.2	10.6
HCM Lane LOS	B	A	A	B
HCM 95th-tile Q	2.9	0.2	0.2	1.9

Queuing Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	48	83	151	26	148	167	272	27	32	282	36
v/c Ratio	0.22	0.29	0.41	0.11	0.59	0.24	0.13	0.03	0.05	0.14	0.04
Control Delay	33.7	42.4	10.1	31.6	50.4	8.9	11.0	0.0	7.7	12.1	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	33.7	42.4	10.1	31.6	50.4	8.9	11.0	0.0	7.7	12.1	0.1
Queue Length 50th (ft)	25	51	0	14	90	39	44	0	7	46	0
Queue Length 95th (ft)	56	98	56	36	154	76	74	0	20	76	0
Internal Link Dist (ft)		2827			480		1237			244	
Turn Bay Length (ft)	220		220	220		220		220	220		220
Base Capacity (vph)	217	358	426	246	344	693	2138	1015	694	1975	949
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.23	0.35	0.11	0.43	0.24	0.13	0.03	0.05	0.14	0.04

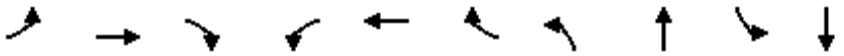
Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	309	889	248	157	1163	363	294	328	74	429	367	368
v/c Ratio	0.94	0.51	0.29	0.56	0.84	0.45	0.77	0.67	0.19	0.91	0.63	0.84
Control Delay	68.6	21.8	3.3	25.0	39.2	4.7	65.0	54.4	1.1	74.9	50.5	38.2
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	68.6	21.8	3.3	25.0	39.2	4.7	65.0	54.4	1.1	74.9	50.5	38.2
Queue Length 50th (ft)	182	236	0	55	422	0	112	124	0	168	137	120
Queue Length 95th (ft)	#365	307	46	94	532	64	#164	173	0	#270	189	#271
Internal Link Dist (ft)		620			1264			758			880	
Turn Bay Length (ft)	560		255	500		500	380		220	540		220
Base Capacity (vph)	337	1738	869	278	1390	810	414	609	431	473	671	470
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.51	0.29	0.56	0.84	0.45	0.71	0.54	0.17	0.91	0.55	0.78

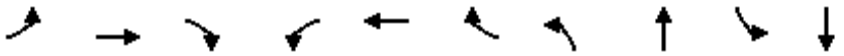
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



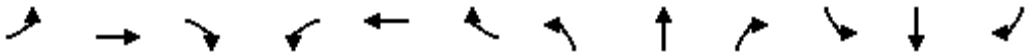
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	53	1280	157	30	1345	54	240	190	183	96
v/c Ratio	0.32	0.70	0.18	0.16	0.76	0.06	0.65	0.46	0.62	0.24
Control Delay	15.4	23.3	3.6	11.9	26.3	0.1	41.4	15.4	41.4	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.4	23.3	3.6	11.9	26.3	0.1	41.4	15.4	41.4	3.1
Queue Length 50th (ft)	15	374	4	8	404	0	137	26	101	0
Queue Length 95th (ft)	32	460	38	21	496	0	213	94	163	13
Internal Link Dist (ft)		1237			1279			286		262
Turn Bay Length (ft)	300		220	110		220	200		200	
Base Capacity (vph)	165	1829	889	185	1759	860	372	411	296	397
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.70	0.18	0.16	0.76	0.06	0.65	0.46	0.62	0.24

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	87	1490	76	54	1283	87	46	66	83	100
v/c Ratio	0.30	0.69	0.07	0.25	0.61	0.09	0.20	0.19	0.32	0.24
Control Delay	9.7	19.5	0.1	10.4	18.8	0.5	31.8	1.3	33.9	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	19.5	0.1	10.4	18.8	0.5	31.8	1.3	33.9	1.3
Queue Length 50th (ft)	19	387	0	11	312	0	23	0	42	0
Queue Length 95th (ft)	37	494	0	25	422	4	52	0	82	0
Internal Link Dist (ft)		1279			1239			302		364
Turn Bay Length (ft)	300		220	300		220	200		200	
Base Capacity (vph)	340	2175	1030	217	2120	1008	289	515	288	553
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.69	0.07	0.25	0.61	0.09	0.16	0.13	0.29	0.18

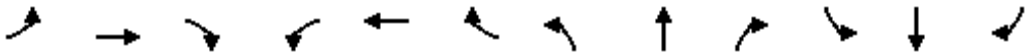
Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	169	1387	84	163	1050	199	173	213	28	261	283	201
v/c Ratio	0.65	0.88	0.11	0.71	0.63	0.23	0.59	0.51	0.09	0.61	0.56	0.51
Control Delay	24.7	34.5	0.6	36.4	22.8	3.2	37.3	47.0	0.6	48.9	44.6	11.5
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	24.7	34.5	0.6	36.4	22.8	3.2	37.3	47.0	0.6	48.9	44.6	11.5
Queue Length 50th (ft)	46	420	0	49	258	0	86	69	0	82	91	5
Queue Length 95th (ft)	#100	#620	4	#157	362	40	143	109	0	128	133	67
Internal Link Dist (ft)		1239			478			755			374	
Turn Bay Length (ft)	400		300	400		220	125		220	300		220
Base Capacity (vph)	262	1573	784	233	1667	851	297	636	399	508	811	510
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.88	0.11	0.70	0.63	0.23	0.58	0.33	0.07	0.51	0.35	0.39

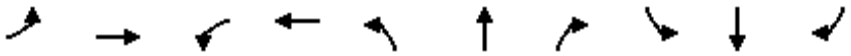
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	21	115	186	172	67	190	126	429	149	172	561	15
v/c Ratio	0.08	0.47	0.50	0.60	0.17	0.40	0.36	0.48	0.18	0.38	0.63	0.02
Control Delay	24.9	41.5	10.5	38.4	32.3	8.1	11.2	18.1	3.1	11.2	21.3	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	0.0
Total Delay	24.9	41.5	10.5	38.4	32.3	8.1	11.2	18.1	3.1	11.2	21.3	0.1
Queue Length 50th (ft)	9	60	0	78	29	0	26	149	0	37	216	0
Queue Length 95th (ft)	26	111	56	134	71	57	56	254	32	74	359	0
Internal Link Dist (ft)		377			181			780			1190	
Turn Bay Length (ft)	95		115	100		100	245			245		150
Base Capacity (vph)	277	722	728	286	722	730	348	892	836	455	892	836
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.16	0.26	0.60	0.09	0.26	0.36	0.48	0.18	0.38	0.63	0.02

Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	69	117	271	195	11	331	217	32	404	7
v/c Ratio	0.23	0.47	0.74	0.55	0.02	0.19	0.24	0.05	0.21	0.01
Control Delay	27.9	41.1	43.3	42.1	10.5	15.2	3.1	10.5	12.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.9	41.1	43.3	42.1	10.5	15.2	3.1	10.5	12.9	0.0
Queue Length 50th (ft)	33	62	149	112	3	62	0	8	60	0
Queue Length 95th (ft)	66	118	#252	193	12	101	41	24	123	0
Internal Link Dist (ft)		147		325		451			1419	
Turn Bay Length (ft)	220		220		220		220	220		200
Base Capacity (vph)	370	355	369	387	551	1787	906	591	1935	933
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.33	0.73	0.50	0.02	0.19	0.24	0.05	0.21	0.01

Intersection Summary

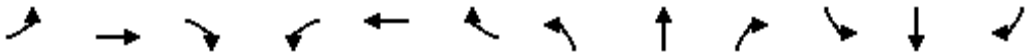
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	288	190	374	322	227	126	597	162	187	951	58
v/c Ratio	0.87	0.51	0.82	0.89	0.64	0.47	0.40	0.22	0.47	0.63	0.08
Control Delay	52.1	39.5	33.8	54.4	34.6	19.6	22.1	4.3	18.6	26.1	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	52.1	39.5	33.8	54.4	34.6	19.6	22.1	4.3	18.6	26.1	0.6
Queue Length 50th (ft)	139	107	117	159	97	36	132	0	56	239	0
Queue Length 95th (ft)	150	126	123	168	115	64	160	14	91	266	0
Internal Link Dist (ft)		572			444		360			470	
Turn Bay Length (ft)	200		200			110			300		250
Base Capacity (vph)	332	773	747	363	693	267	1505	748	396	1507	707
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.25	0.50	0.89	0.33	0.47	0.40	0.22	0.47	0.63	0.08

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	47	100	231	46	148	146	394	38	36	589	55
v/c Ratio	0.22	0.39	0.55	0.19	0.57	0.29	0.19	0.04	0.06	0.30	0.06
Control Delay	31.3	42.5	10.7	30.8	42.6	9.1	11.1	0.1	7.7	13.1	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	31.3	42.5	10.7	30.8	42.6	9.1	11.1	0.1	7.7	13.1	0.1
Queue Length 50th (ft)	23	58	0	22	76	32	65	0	8	104	0
Queue Length 95th (ft)	52	107	65	51	139	67	104	0	22	157	0
Internal Link Dist (ft)		2827			480		1237			244	
Turn Bay Length (ft)	220		220	220		220		220	220		220
Base Capacity (vph)	217	501	594	242	492	512	2127	1010	626	1942	935
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.20	0.39	0.19	0.30	0.29	0.19	0.04	0.06	0.30	0.06

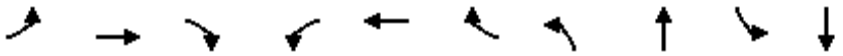
Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	308	1518	416	100	970	520	335	434	168	433	310	208
v/c Ratio	0.94	0.93	0.48	0.70	0.76	0.62	0.73	0.81	0.42	0.80	0.50	0.47
Control Delay	68.1	40.5	8.8	46.2	38.1	8.5	57.4	59.8	7.5	59.1	46.3	9.4
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	68.1	40.5	8.8	46.2	38.1	8.5	57.4	59.8	7.5	59.1	46.3	9.4
Queue Length 50th (ft)	179	557	53	36	338	29	125	166	0	162	110	0
Queue Length 95th (ft)	#374	#763	143	#113	440	137	174	228	45	222	163	66
Internal Link Dist (ft)		620			1264			758			880	
Turn Bay Length (ft)	560		255	500		500	380		220	540		220
Base Capacity (vph)	328	1641	861	142	1269	836	600	619	434	630	667	467
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.93	0.48	0.70	0.76	0.62	0.56	0.70	0.39	0.69	0.46	0.45

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

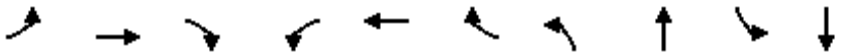


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	157	1851	162	106	1502	171	123	107	113	66
v/c Ratio	1.07	1.00	0.18	0.72	0.81	0.19	0.40	0.27	0.38	0.17
Control Delay	117.3	48.2	3.4	43.3	26.5	3.7	38.0	4.3	37.4	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	117.3	48.2	3.4	43.3	26.5	3.7	38.0	4.3	37.4	0.9
Queue Length 50th (ft)	~72	~668	5	28	448	8	69	0	63	0
Queue Length 95th (ft)	#209	#864	37	#110	548	42	120	23	112	0
Internal Link Dist (ft)		1237			1279			286		262
Turn Bay Length (ft)	300		220	110		220	200		200	
Base Capacity (vph)	147	1849	897	147	1849	897	307	392	299	392
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.07	1.00	0.18	0.72	0.81	0.19	0.40	0.27	0.38	0.17

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

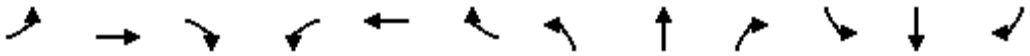
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	223	1668	179	130	1409	189	186	267	199	184
v/c Ratio	0.99	0.94	0.21	0.83	0.86	0.23	0.70	0.79	0.88	0.56
Control Delay	85.4	37.1	4.6	57.9	32.4	5.8	45.8	36.1	70.0	17.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.4	37.1	4.6	57.9	32.4	5.8	45.8	36.1	70.0	17.9
Queue Length 50th (ft)	98	526	10	34	425	14	100	75	107	21
Queue Length 95th (ft)	#278	#783	49	#155	#631	58	161	168	#185	87
Internal Link Dist (ft)		1279			1239			302		364
Turn Bay Length (ft)	300		220	300		220	200		200	
Base Capacity (vph)	225	1773	867	157	1637	812	268	425	225	411
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.94	0.21	0.83	0.86	0.23	0.69	0.63	0.88	0.45

Intersection Summary

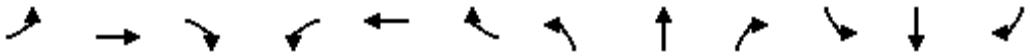
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	254	1689	146	196	1241	259	198	427	76	444	384	253
v/c Ratio	0.86	0.99	0.18	0.92	0.77	0.32	0.86	0.78	0.23	0.95	0.70	0.46
Control Delay	54.2	49.5	3.6	69.9	29.3	5.4	80.9	55.7	1.6	77.9	51.8	22.5
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	54.2	49.5	3.6	69.9	29.3	5.4	80.9	55.7	1.6	77.9	51.8	22.5
Queue Length 50th (ft)	122	606	0	86	379	16	139	154	0	162	136	90
Queue Length 95th (ft)	#266	#791	36	#227	468	65	#269	#213	1	#261	189	167
Internal Link Dist (ft)		1239			478			755			374	
Turn Bay Length (ft)	400		300	400		220	125		220	300		220
Base Capacity (vph)	297	1699	796	214	1608	803	229	554	339	469	554	549
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.99	0.18	0.92	0.77	0.32	0.86	0.77	0.22	0.95	0.69	0.46

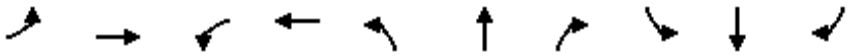
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	14	43	113	86	48	173	149	645	88	149	583	21
v/c Ratio	0.06	0.19	0.35	0.31	0.13	0.38	0.42	0.69	0.10	0.48	0.62	0.02
Control Delay	25.5	36.5	6.2	29.8	30.2	8.3	11.1	21.6	0.7	12.9	19.7	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	0.0
Total Delay	25.5	36.5	6.2	29.8	30.2	8.3	11.1	21.6	0.7	12.9	19.7	0.1
Queue Length 50th (ft)	6	21	0	37	20	0	31	261	0	31	224	0
Queue Length 95th (ft)	21	52	27	75	56	56	57	400	5	57	345	0
Internal Link Dist (ft)		377			181			780			1190	
Turn Bay Length (ft)	95		115	100		100	245			245		150
Base Capacity (vph)	253	756	730	274	756	745	359	933	868	311	933	868
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.06	0.15	0.31	0.06	0.23	0.42	0.69	0.10	0.48	0.62	0.02

Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	69	129	376	222	33	445	429	84	731	22
v/c Ratio	0.24	0.55	0.80	0.48	0.10	0.29	0.46	0.19	0.46	0.03
Control Delay	25.1	48.4	41.0	36.2	13.9	20.5	3.9	14.5	21.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.1	48.4	41.0	36.2	13.9	20.5	3.9	14.5	21.7	0.0
Queue Length 50th (ft)	30	76	199	121	10	100	0	26	182	0
Queue Length 95th (ft)	60	136	#310	203	27	150	60	57	256	0
Internal Link Dist (ft)		147		325		451			1419	
Turn Bay Length (ft)	220		220		220		220	220		200
Base Capacity (vph)	482	352	479	460	321	1524	926	450	1601	798
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.37	0.78	0.48	0.10	0.29	0.46	0.19	0.46	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	42	5	126	60	43	200	853	23	46	745	48
v/c Ratio	0.21	0.04	0.55	0.30	0.23	0.40	0.36	0.02	0.10	0.34	0.05
Control Delay	37.2	44.2	17.8	38.8	25.4	7.3	9.5	0.0	5.3	10.7	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	37.2	44.2	17.8	38.8	25.4	7.3	9.5	0.0	5.3	10.7	0.1
Queue Length 50th (ft)	23	3	0	33	9	35	137	0	7	118	0
Queue Length 95th (ft)	53	14	56	70	42	68	204	0	20	173	0
Internal Link Dist (ft)		572			444		360			470	
Turn Bay Length (ft)	200		200			110			300		250
Base Capacity (vph)	204	468	492	208	443	500	2360	1092	478	2172	1013
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.01	0.26	0.29	0.10	0.40	0.36	0.02	0.10	0.34	0.05

Intersection Summary

Key Pages from Area Traffic Studies

Erie Gateway Mobility Study

Prepared for: Torti Gallas

March 2024

DN23-0749

FEHR PEERS

2. Introduction

Background Information

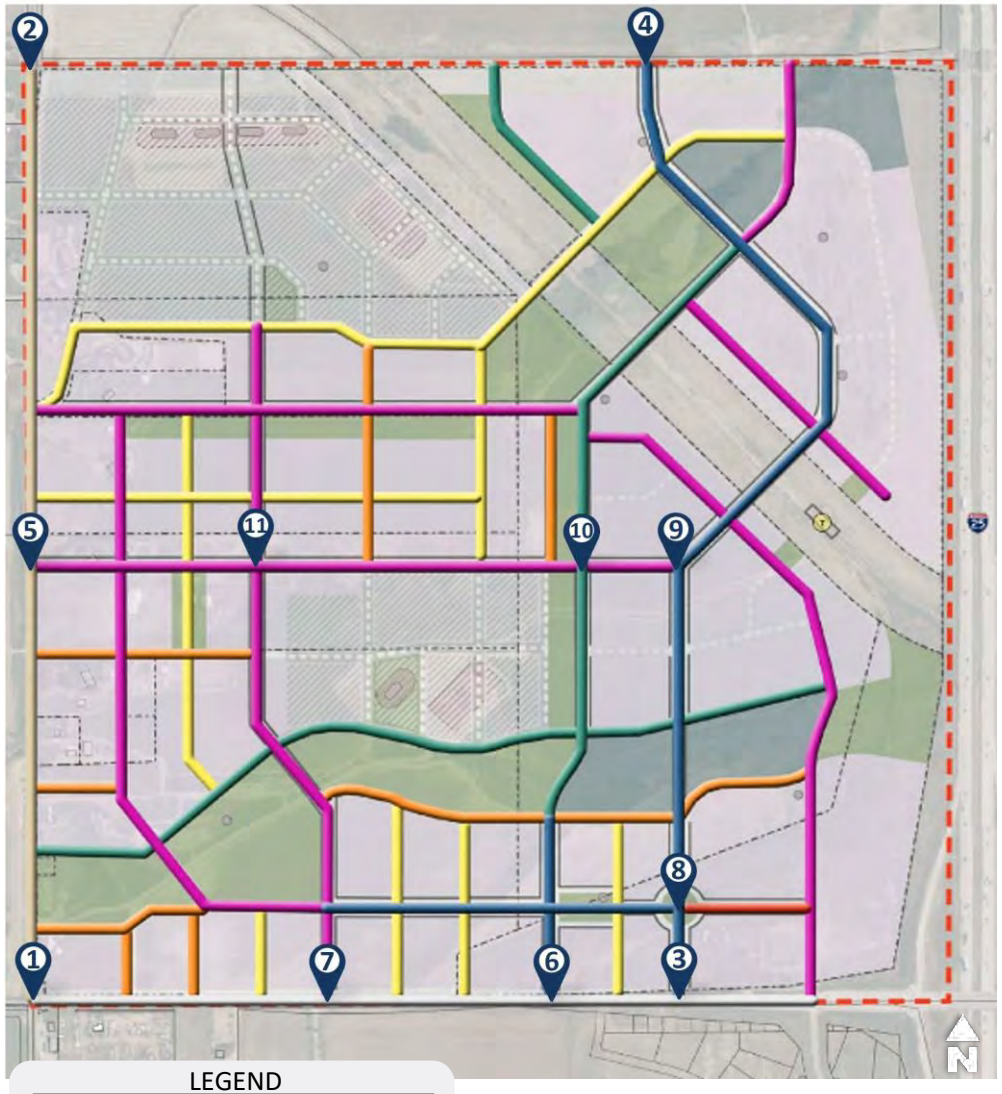
Project

The Erie Gateway development is proposed to be a mixed-use development comprised of commercial centers, mixed-use residential areas, employment centers, parks and open space, and public facilities, with sizes denoted in **Table 2** below. Erie Gateway is comprised of 358.02 acres located on the north side Erie Parkway between County Road 7 and I-25 in Erie, Colorado. The existing site is largely undeveloped in the existing conditions. Within the project site in the existing conditions, there are existing oil and gas facilities that will remain undeveloped. The proposed development, shown in **Figure 1**, would develop this space into 358.02 acres of mixed-use development. There will also be new internal roadways built throughout the development.

The project is located along Erie Parkway and County Road 10, between County Road 7 and I-25. Erie Parkway is currently a two-lane arterial that runs east-west through the Town of Erie. The current posted speed limit on Erie Parkway close to the site is 50 miles per hour. The stretch of County Road 10 where the development is located is currently a dirt road with a posted speed limit of 35 miles per hour, but is proposed to be a four-lane arterial that runs east-west in the Town of Erie. County Road 7 is a two-lane arterial that runs north-south in Erie and has a posted speed limit of 45 miles per hour. There is also an I-25 interchange located on the southeast corner of the development.

While the project and surrounding areas are currently largely undeveloped, there are multiple proposed developments adjacent to the project site. Directly north of Erie Gateway is the proposed North Station development, which has mixed-use residential, commercial, office, and industrial spaces. To the west of the project will be the proposed North Westerly development, which will be composed primarily of residential land uses. Volumes generated from North Westerly and North Station developments were added to key adjacent intersections. Fehr & Peers applied an annual growth rate of 2.7% to the existing traffic counts in Appendix C to account for increased growth and development in the Town of Erie, including the proposed North Station and North Westerly developments.

The study intersections bordering the project were chosen because of their future proposed signalization. Study intersections internal to the site were chosen in collaboration with the Town of Erie staff.



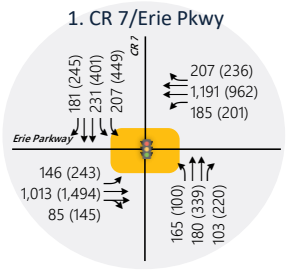
LEGEND

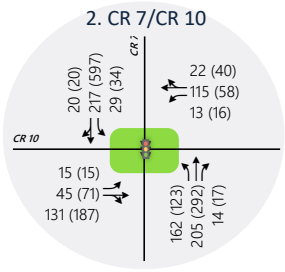
Stop Sign Signalized

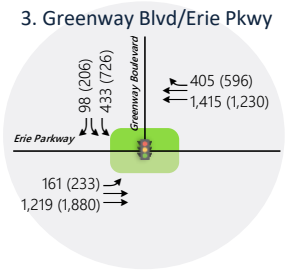
Lane Configuration: AM (PM) / AM (PM) / AM (PM) — Peak Hour Traffic Volume per lane

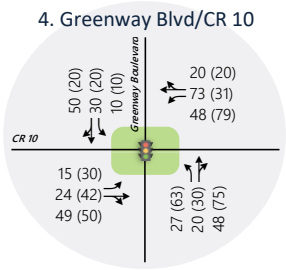
Intersection Level of Service (LOS):

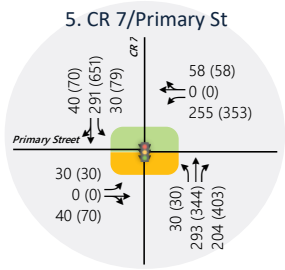
AM / PM: A B C D E F

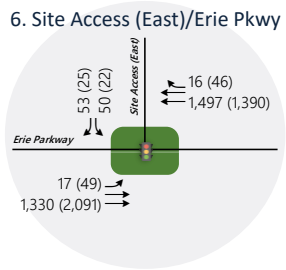


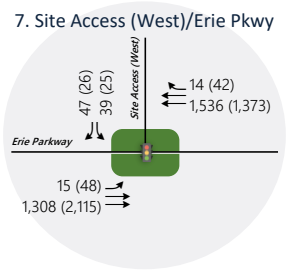


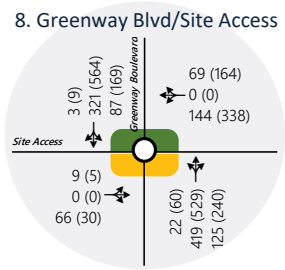


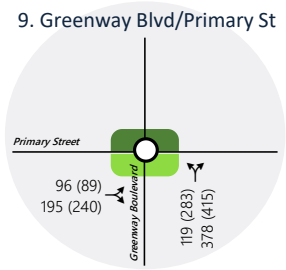


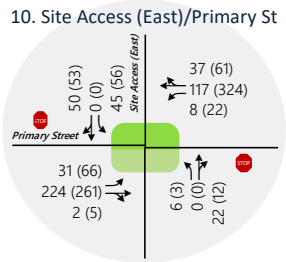












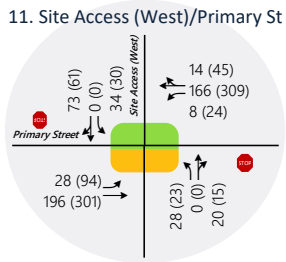


Figure 2

Roadway and Intersection Configurations and Levels of Service

Note: The Figure shows full build out, with the recommended intersection configurations

LSC TRANSPORTATION CONSULTANTS, INC.

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

TRANSPORTATION
CONSULTANTS, INC.

February 7, 2022

Mr. Jon Lee
Community Development Group of Erie, Inc.
2500 Arapahoe Avenue, Suite 220
Boulder, CO 80302

Re: North Station
Technical Memorandum
Erie, CO
LSC #210200

Dear Mr. Lee:

In response to your request, LSC Transportation Consultants, Inc. has prepared this technical memorandum for the proposed North Station development located in the Town of Erie as shown in Figure 1.

REPORT CONTENTS

The report contains the following: the existing traffic volumes, lane geometry, and traffic control in the area; the proposed street connectivity and conceptual land use plan; and a summary of the proposed roadway classifications in the vicinity of the site.

LAND USE AND ACCESS

Figures 2a and 2b show the proposed street connectivity and conceptual land use plan. The Town of Erie owned Erie Gateway site to the south is also shown in Figure 2a.

Existing Traffic Conditions

Figures 3a and 3b show the existing traffic volumes, lane geometry, traffic control, and posted speed limits 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 February, 2021.

PROPOSED ROADWAY CLASSIFICATIONS

The Erie Transportation Plan (ETP) Roadway Plan (Figure 15 of the ETP) is attached for reference and shows the Town's proposed roadway classification details in the area. The following summarizes the details in the ETP as well as the roadways proposed by the applicant.

WCR 7 and 10 are both shown in the ETP as four-lane principal arterials with 140 feet of right-of-way plus a 30-foot landscape buffer and utility easement on each side. The applicant proposes 120 feet of right-of-way with a 30-foot landscape buffer and utility easement on each side which is sufficient to accommodate the proposed cross-section.

WCR 12 is shown in the ETP as a two-lane minor arterial with 120-feet of right-of-way plus a 30-foot landscape buffer and utility easement on each side. The applicant proposes 100 feet of right-of-way with a 30-foot landscape buffer and utility easement on each side which is sufficient to accommodate the proposed cross-section.

The ETP shows WCR 7 jogging to the east between SH 52 and Erie Parkway. It is our understanding this is no longer desired by the Town because it would be difficult if not impossible to achieve north of the site.

The ETP shows WCR 12 with a future grade-separated crossing of I-25 with no interchange. This would require considerable reconstruction because both roadways are currently at grade. The applicant does not propose WCR 12 cross over I-25 considering there is an existing interchange with SH 52 one mile to the north and a proposed interchange at WCR 10 one mile to the south.

Coordination with Town of Erie

Coordination will be needed with the Town of Erie to confirm the details in this memorandum are appropriate for use in a future traffic study. Coordination will also be needed regarding the details of the adjacent Erie Gateway property to the south.

* * * * *

We trust our findings will assist in the Town's review and facilitate the steps needed to eventually complete a future traffic study for the proposed North Station and Erie Gateway projects. 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 2-7-22

Enclosures: Figures 1 - 3b
Traffic Count Reports
Figure 15 of Town of Erie Transportation Plan (ETP)

W:\LSC\Projects\2021\210200-ErieGateway\Report\NorthStation-TechMemo-020722.wpd

Figure 1

Vicinity Map

North Station (LSC #210200)

Approximate Scale
Scale: NTS

Figure 2a

Conceptual Street Connectivity

North Station (LSC #210200)

LSC TRANSPORTATION

Approximate Scale
Scale: NTS

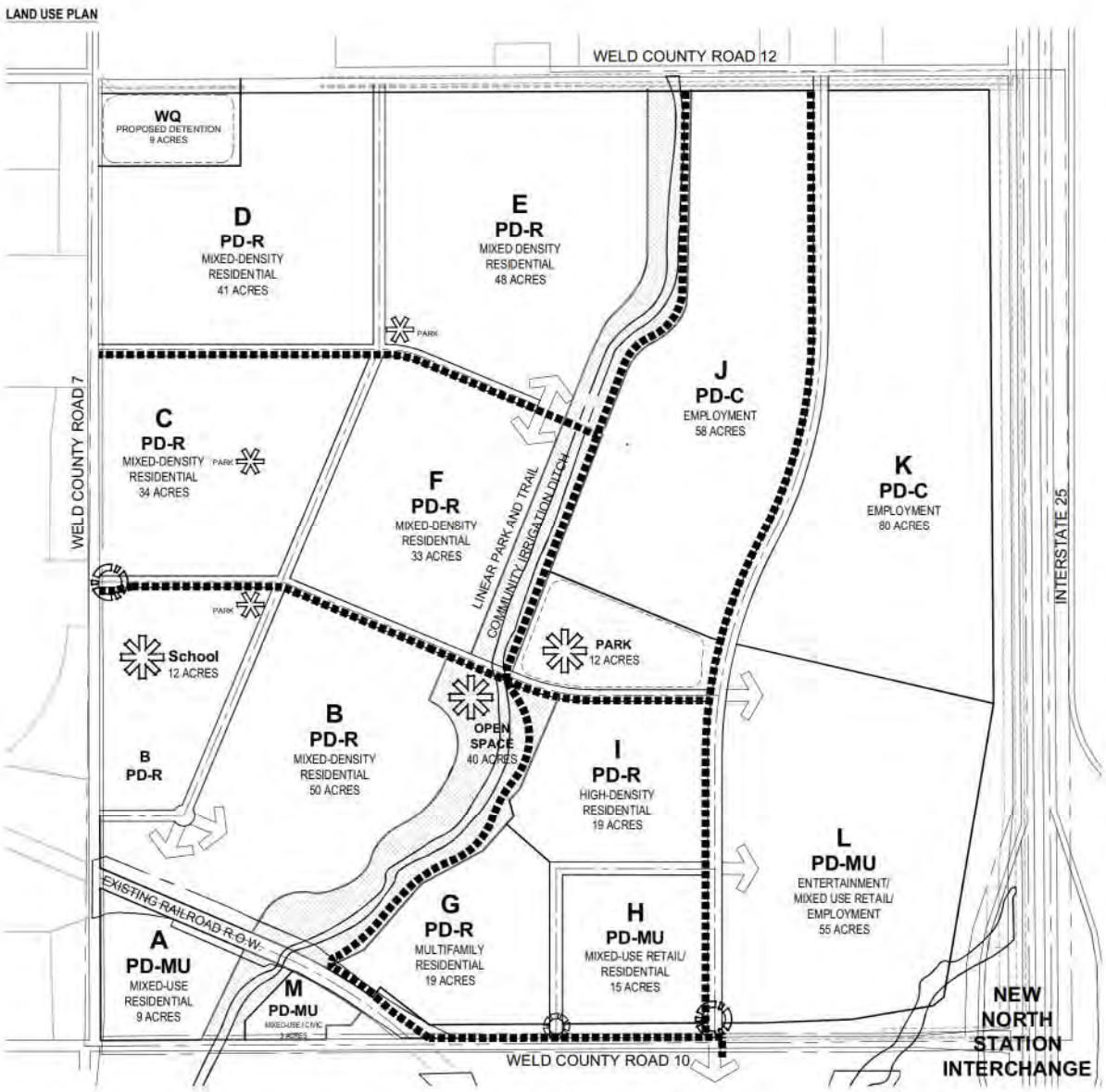


Figure 2b

Conceptual Land Use Plan

North Station (LSC #210200)

LSC TRANSPORTATION CONSULTANTS, INC.

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

January 21, 2025

Mr. Brad Dixon
Toll Brothers
10 Inverness Drive East, Suite 125
Englewood, CO 80112

Re: Summerfield
Supplemental Analysis
Technical Memorandum
Erie, CO
LSC #200540

Dear Mr. Dixon:

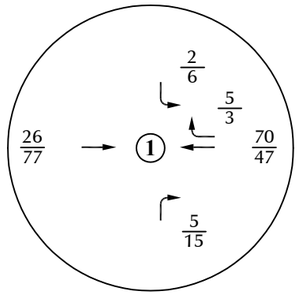
In response to your request, LSC Transportation Consultants, Inc. has prepared this updated technical memorandum for the first phase of the proposed Summerfield residential development shown in Figure 1 to partially amend the trip assignment assumed in the July 15, 2021 *Preliminary Plat 1 Supplemental Analysis* by LSC. The change was made to allow the northbound left-turn movement to be made at Intersection #2 - this movement was assumed to be restricted in the original 2021 Supplemental Analysis. The applicant and the Town of Erie want to allow this movement and accelerate as much as possible the future signalization of this intersection because approximately half of Preliminary Plat 1 homes are proposed as Active Adult.

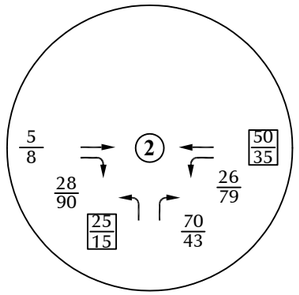
REPORT CONTENTS

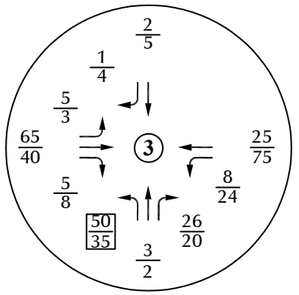
This memorandum modifies Figure 7b and Figure 9 from the July 15, 2021 supplement analysis to allow the northbound left-turn movement at Intersection #2 (SH 52/Local Access/Site Access). It is important to allow this movement to support the need for traffic signal control at this intersection as early as allowed by CDOT. The latest conceptual site plan is shown in Figure 2. There are two options for both Figure 7b and Figure 9 to show the estimated traffic volumes with and without traffic signal control at Intersection #2. A capacity analysis is provided for each scenario to show the benefit traffic signal control will have at Intersection #2.

PROPOSED LAND USE

The Summerfield residential development is planned to include about 821 dwelling units in the initial phase to be permitted with CDOT. It is important to note that about 394 of these dwelling units are planned to be restricted to Active Adult residents over the age of 55 years.







Intentionally
④
Left Blank

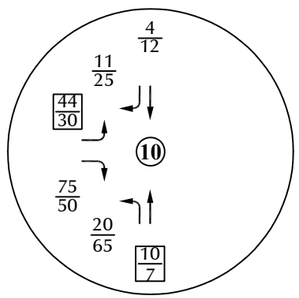
Intentionally
⑤
Left Blank

Intentionally
⑥
Left Blank

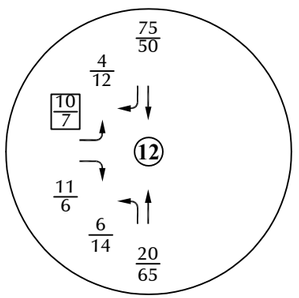
Intentionally
⑦
Left Blank

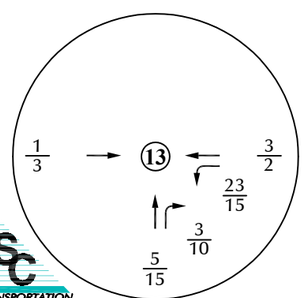
Intentionally
⑧
Left Blank

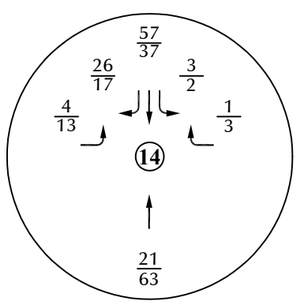
Intentionally
⑨
Left Blank



Intentionally
⑪
Left Blank







TRANSPORTATION CONSULTANTS, INC.

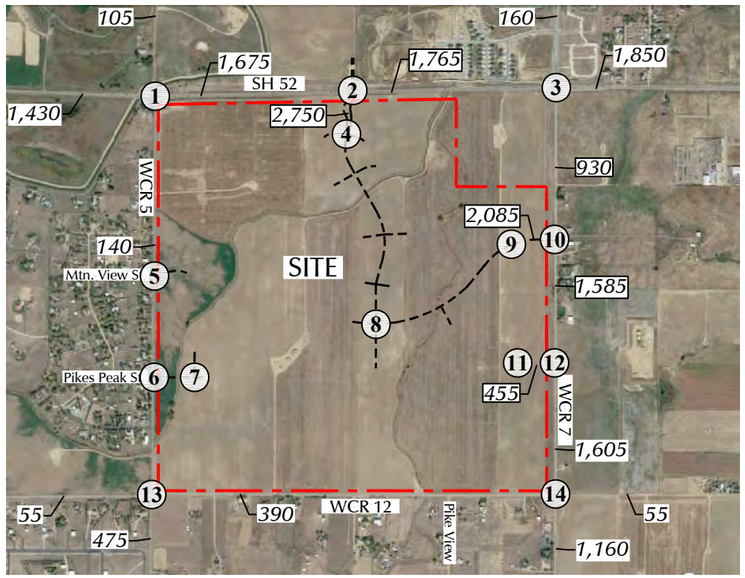
N

Approximate Scale
Scale: 1"= 2,000'

LEGEND:

$\frac{55}{36}$ = AM Peak–Hour Traffic / PM Peak–Hour Traffic

1,500 = Average Weekday Traffic



Note: Assumes a total of 821 dwelling units.

MODIFIED FROM THE JULY 15, 2021 SUPPLEMENTAL ANALYSIS TO ALLOW NB LT MOVEMENT AT INTERSECTION #2. A BOX WAS PLACED AROUND THE VOLUMES THAT WERE CHANGED.

Option 1 Figure 7b

Assignment of Preliminary Plat Site-Generated Traffic Assuming No Traffic Signal at Intersection #2

Summerfield Supplemental Analysis (LSC #200540)

LSC TRANSPORTATION CONSULTANTS, INC.

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

August 19, 2024

Mr. Brad Dixon
Toll Brothers
10 Inverness Drive East, Suite 125
Englewood, CO 80112

Re: Summerfield -
Preliminary Plat 2
Erie, CO
LSC #200540

Dear Mr. Dixon:

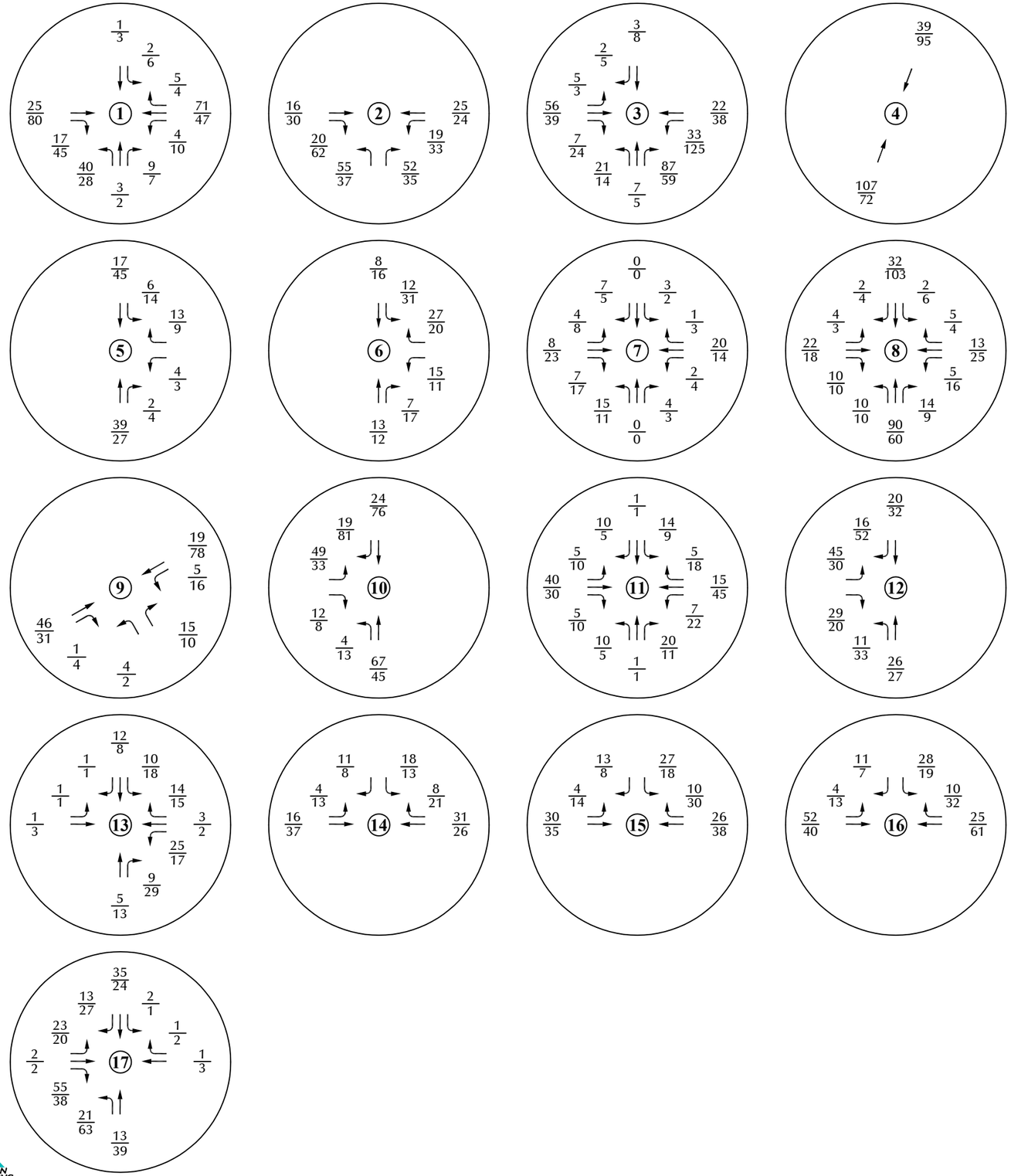
In response to your request, LSC Transportation Consultants, Inc. has prepared this updated traffic impact analysis for the proposed Summerfield - Preliminary Plat 2 residential development to address Town comments. As shown on Figure 1, the site is located south of State Highway 52 (SH 52), north of WCR 12, east of WCR 5, and west of WCR 7 in Erie, Colorado.

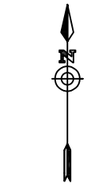
REPORT CONTENTS

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; the projected short-term and long-term background and resulting total traffic volumes on the area roadways; the site's projected traffic impacts; and any recommended roadway improvements to mitigate the site's traffic impacts.

LAND USE AND ACCESS

The site is currently undeveloped and at buildout is proposed to include about 679 active-adult dwelling units, about 516 traditional single-family detached dwelling units, and about 106 town-homes. Access is proposed from SH 52, WCR 5, WCR 7, and WCR 12. Figure 2a shows the conceptual site plan. The proposed access to SH 52 is consistent with the *SH 52 Access Control Plan* (ACP). Figure 2b shows the pedestrian and bicycle plan.





Approximate Scale
Scale: 1"= 2,000'

LEGEND:

$\frac{55}{36}$ = AM Peak–Hour Traffic / PM Peak–Hour Traffic

1,500 = Average Weekday Traffic

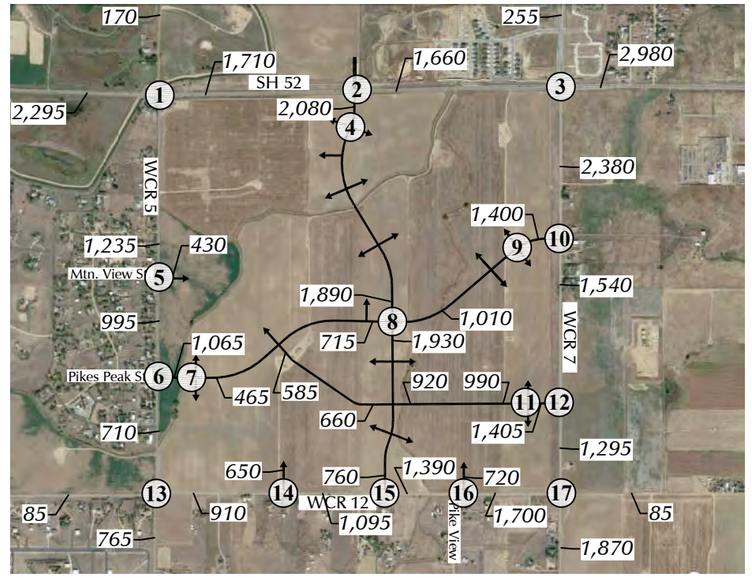


Figure 7

Assignment of Site-Generated Traffic

Summerfield - Preliminary Plat 2 (LSC #200540)

LSC TRANSPORTATION CONSULTANTS, INC.

LSC TRANSPORTATION CONSULTANTS, INC.

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

August 3, 2023

Mr. Matt Jenkins
Daybreak Recovery Acquisition, LLC
c/o Raintree Investment Corp.
7200 S. Alton Way, Suite C-400
Centennial, CO 80112

Re: Colliers Hill Filing 6
Traffic Impact Analysis
Erie, CO
LSC #200871

Dear Mr. Jenkins:

In response to your request, LSC Transportation Consultants, Inc. has prepared this updated traffic impact analysis for the proposed Colliers Hill Filing 6 to address Town comments. 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 2028 and 2043 background traffic, and any recommended roadway improvements to mitigate the site's traffic impacts.

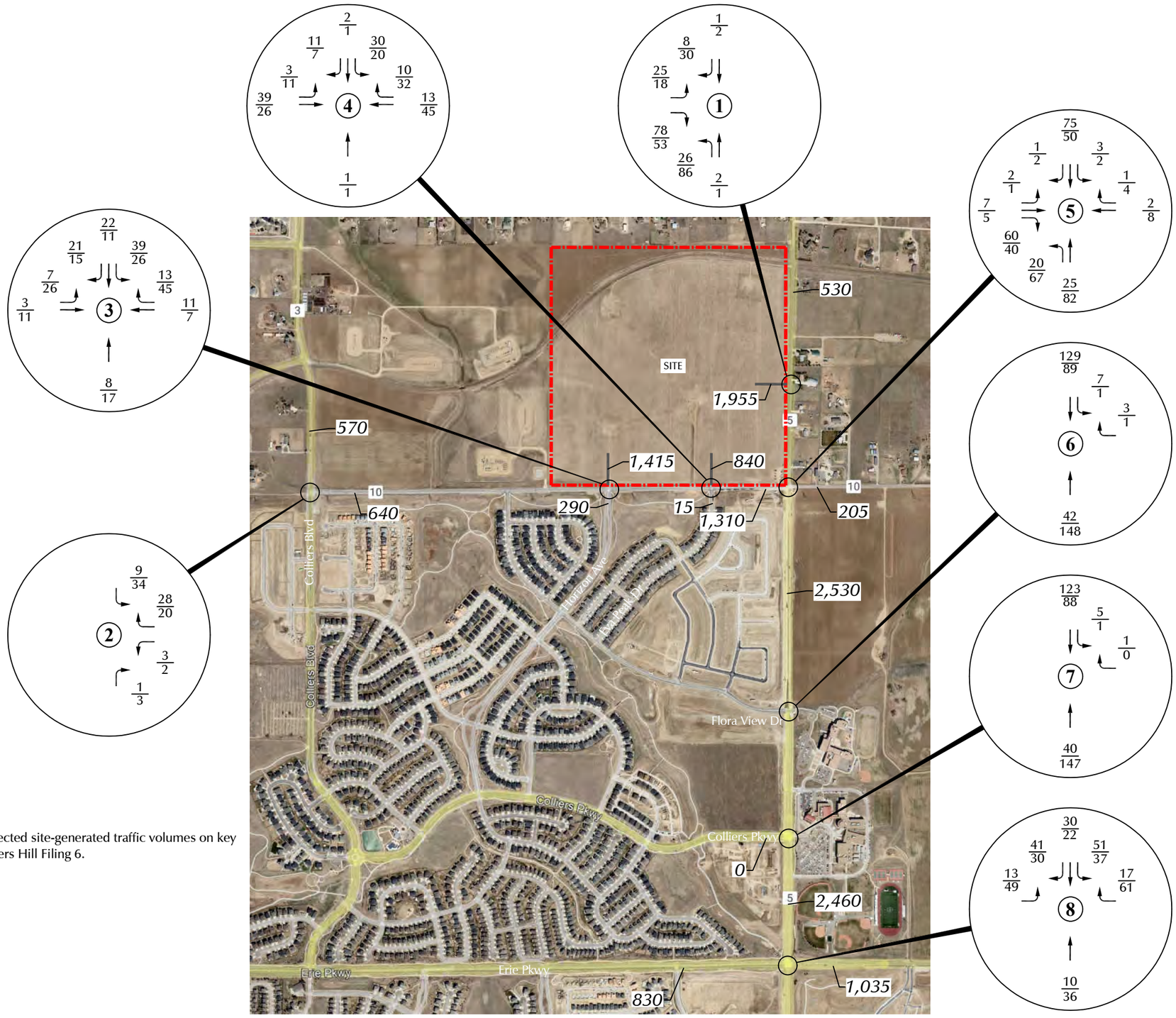
LAND USE AND ACCESS

The existing site is agricultural use with a few oil and gas wells. The site is proposed to include 480 residential dwelling units including 338 single-family detached homes and 142 single-family attached homes. Access is proposed to WCR 10 aligning with the existing Horizon Avenue and Eva Peak Drive intersections and to WCR 5 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.



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:

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

1,000 = Average Daily Traffic

LSC TRANSPORTATION CONSULTANTS, INC.

Figure 7a

Assignment of Site-Generated Traffic

Colliers Hill Filing 6 Update (LSC #200871)

ALDRIDGE TRANSPORTATION CONSULTANTS, LLC

Advanced Transportation Planning and Traffic Engineering

John M.W. Aldridge, PE, PTOE, AICP
Colorado Registered Professional Engineer
Professional Traffic Operations Engineer
American Institute of Certified Planners

1082 Chimney Rock Road
Highlands Ranch, CO 80126
Tele: 303-703-9112
Fax: 303-703-9152
Mobile: 303-594-4132
Email: john@atceng.com

March 28, 2018

Mr. Michael Weiher
Terracina Design
10200 E. Girard Ave. Suite A-314
Denver, CO 80231

RE: Traffic Impact Study 3rd Update
Eire Highlands, Eire, CO

Dear Mr. Weiher:

This technical letter provides the third update to the Eire Highlands Traffic Impact Study prepared by this firm dated August 2013.

INTRODUCTION

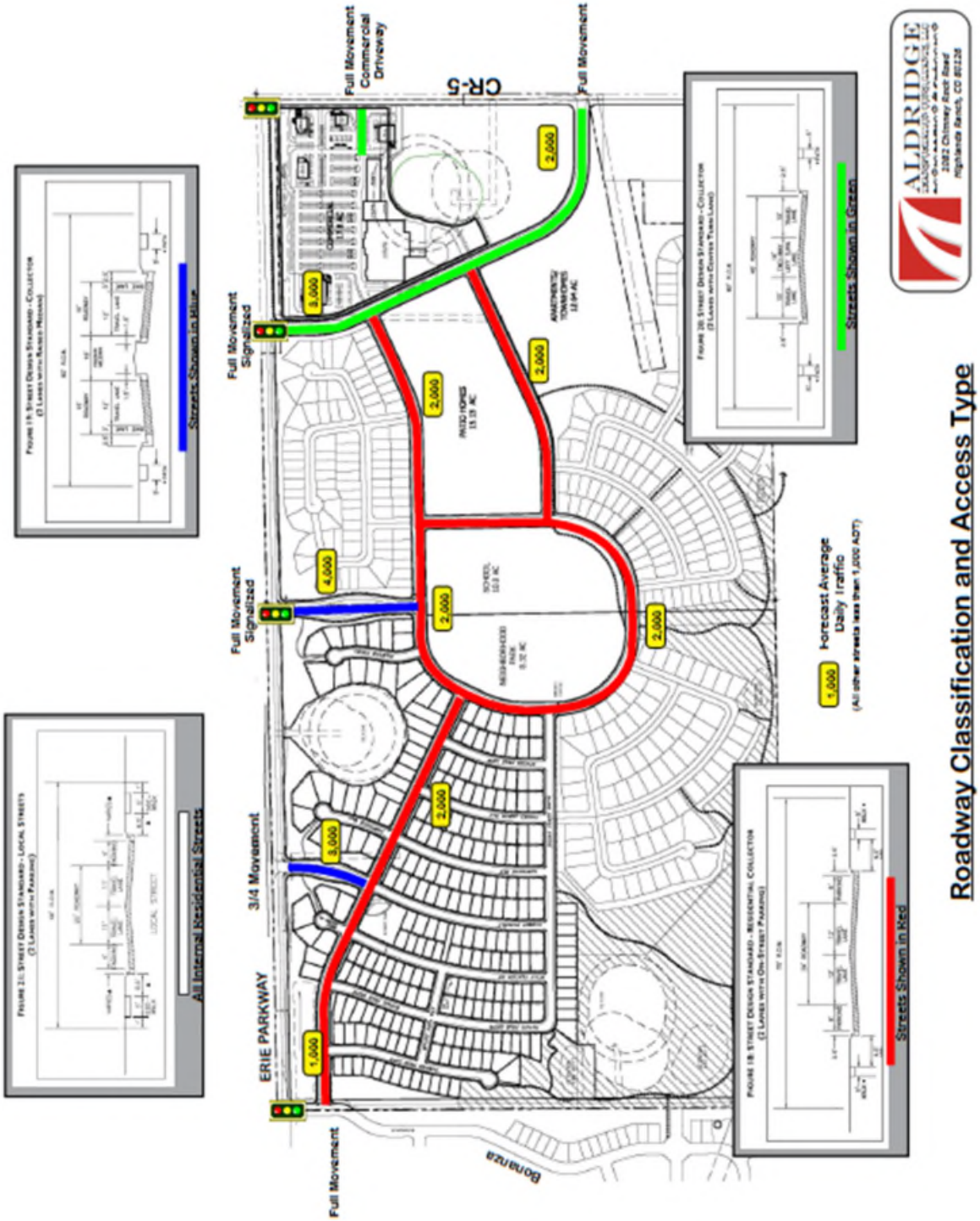
This update considers the total build out of the residential filings in Eire Highlands and addresses the question of whether traffic signal control will be warranted at Erie Parkway and Highlands Blvd. upon build out. The most recent site plan for Erie Highlands features 877 homes within 13 filings, 3 planning areas and a fully built out Glacier Drive. The site plan is consistent with the roadway and traffic control network graphic that was included in the 2013 study. The graphic is shown on the next page. The most recent site plan is attached for reference.

TRIP GENERATION AND DISTRIBUTION

The trip generation rates for the residential development are from the ***ITE Trip Generation Manual, 10th Edition.*** Note that although the site includes 288 carriage and townhomes, these are no longer differentiated in new trip generation manual. They are considered as single-family units. The following worksheet provides the ADT and AM/PM Peak Hour traffic volumes.

Trip Generation Worksheet

ITE Code	Land Use	Unit	Quantity	ADT	AM In	AM Out	PM In	PM Out
210	Single Family	Units	877	*9.44*	*0.19*	*0.55*	*0.63*	*0.37*
				8279	167	482	553	324
Total Trips				**8279**	**167**	**482**	**553**	**324**


Roadway Classification and Access Type
ALDRIDGE
Full Movement Commercial Driveway
CR-5
Full Movement
Full Movement Signalized
Full Movement Signalized
3/4 Movement
ERIE PARKWAY
Full Movement
Bonanza
Forecast Average Daily Traffic
Streets Shown in Green
Streets Shown in Red
Streets Shown in Blue
All Internal Residential Streets

DEVELOPMENT SUMMARY				
LAND USE	PRODUCT	ACRES	% ACRES	UNITS
RESIDENTIAL		148.9	50.3%	
Single Family Detached (47'X100')	900			352
Single Family Detached (54'X110')	700-800			144
Single Family Detached (64'X110')	600			93
Carriage House (2,800 s.f. min.)		15.4	5.2%	156
Apartment/Townhomes		12.6	4.3 %	132
COMMERCIAL		17.8	6.0%	
SCHOOL		10.0	3.4%	
PARKS & OPEN SPACE (PUBLIC)		47.1	15.9%	
AMENITY		0.9	0.3%	
OIL & GAS		24.8	8.4%	
RIGHT-OF-WAY		18.3	6.2%	
TOTAL		295.8		877

ERIE HIGHLANDS
ILLUSTRATIVE SITE PLAN

OAKWOOD HOMES

terracina design

Scale: 1" = 200' March 28, 2018

0 200 400 800

Master Traffic Impact Study for:

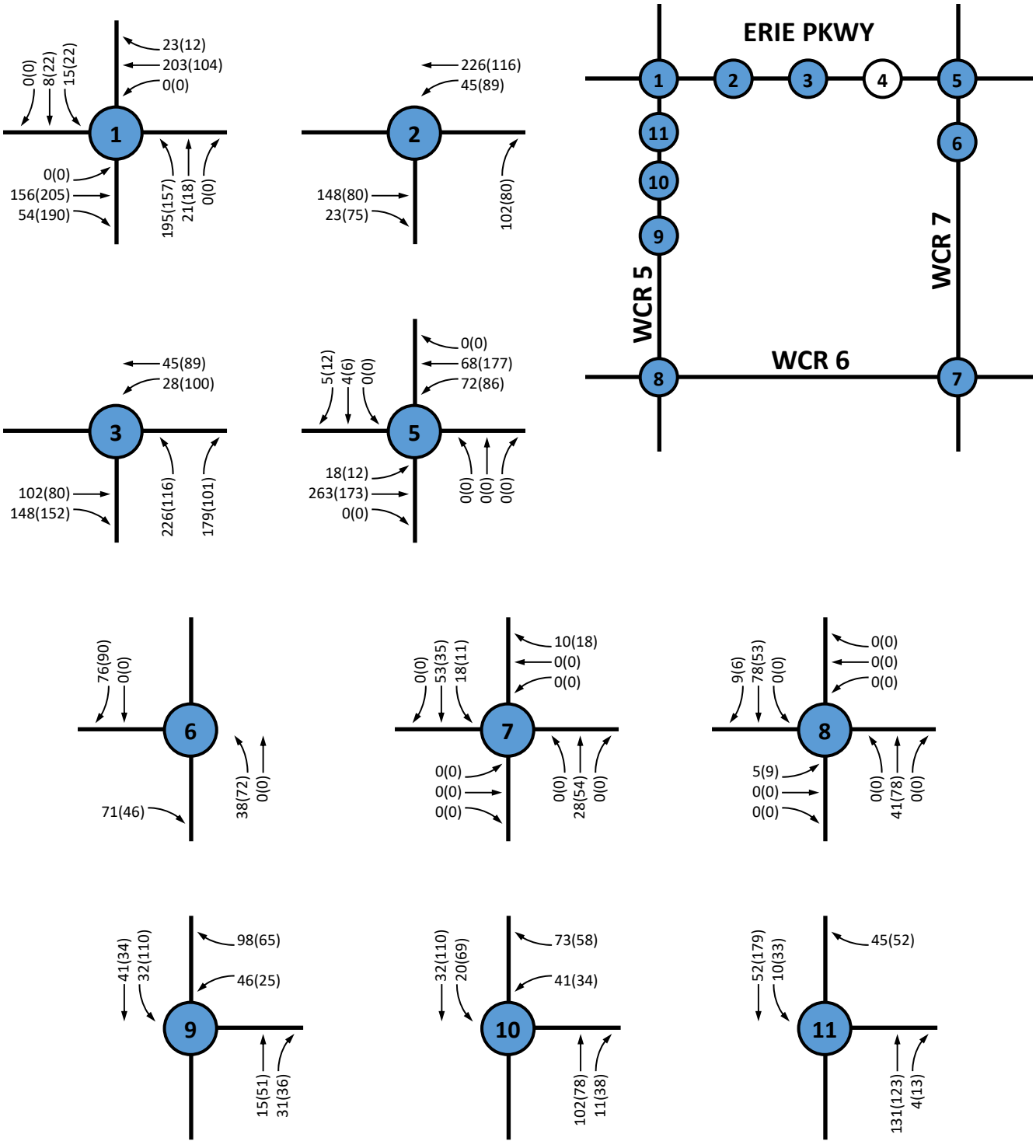
Westerly

Prepared for:

Erie Land Company, LLC
1601 Blake Street, Suite 200
Denver, Colorado 80202

Prepared by:

Matrix DESIGN GROUP



LEGEND

100(50) → AM(PM) PEAK HOUR TRAFFIC VOLUMES

NORTH

Matrix DESIGN GROUP

WESTERLY MASTER TRAFFIC IMPACT STUDY

Figure 12

BUILD-OUT (2025) SITE-GENERATED TRAFFIC

NORTH WESTERLY
CONCEPTUAL UTILITY REPORT

PREPARED FOR

Southern Land Company
1225 17th Street, Suite 2420
Denver CO 80202

PREPARED BY

KT ENGINEERING
ENGINEERS • SURVEYORS

KT Engineering, LLC
12500 W 58TH Ave, Suite 230
Arvada, CO 80002

DATE

March 2025

Table of Contents

GENERAL LOCATION AND DESCRIPTION 1
DESIGN CRITERIA 1
SANITARY SEWER 1
WATER 2

APPENDIX

A) Vicinity Map
B) Utility Maps
C) Sanitary Sewer Flow Rate
D) Water Flow Rate

GENERAL LOCATION AND DESCRIPTION

The North Westerly site is bounded to the north by Weld County Road 10, to the east by Weld County Road 7, to the south by Erie Parkway, and to the west by Weld County Road 5. The proposed site abuts Soaring Heights PK-8 School and Erie High School on the west side of the site and a rural subdivision to the east platted as Carlson Subdivision.

North Westerly is in the northwest quarter and the south half of Section 16, Township 1 North, Range 68 West of the 6th Principal Meridian.

A General Location Map has been provided in Appendix A.

DESIGN CRITERIA

The water and sewer systems for the North Westerly development have been designed using the 2024 Town of Erie Engineering Standards and Specifications.

SANITARY SEWER

1) Layout and connection to Town sewer system

The North Westerly development will tie into the Town of Erie's existing sanitary sewer system via three proposed sewer outfalls.

Outfall #1 will serve the southwest corner of the site. A sewer main will be extended from the site, west along the north side of Erie Parkway to connect to an existing manhole and eighteen-inch main that will convey flows to the Coal Creek Interceptor. Previous utility reports have allowed for approximately 900 single-family equivalents (SFE) of downstream capacity for this outfall.

Outfall #2 serves the northwest corner of the site which is also within the Town's Weld County Road 3 Sewer Basin. An eight-inch sewer main has been stubbed under CR 5 to the North Westerly property as part of the Colliers Hill Filing G4 development. It is anticipated that approximately 200 units will utilize this outfall. Review of the Colliers Hill G4 utility report shows that this stub may have been overlooked in the sewer capacity calculations. Preliminary capacity calculations with the additional two hundred units show that a few runs of pipe may slightly exceed the Town's capacity criteria. During Final design a variance may be requested.

Outfall #3 serves the remaining portions of the site, approximately 1133 units, and corresponds with the Town's Weld County Road 5 sewer basin. There is not an existing outfall for this sewer basin. A proposed fifteen-inch main will be constructed from the sites northwest north along Weld County Road 5 to the intersection of Colorado Highway 52. At this point the sewer will connect to a proposed thirty-inch main to be construction with the Summerfield development.

2) Average and peak flow calculations

The anticipated average sewer flow from the entire development will have an average daily flow of 0.58 million gallons per day (MGD). Using a peaking factor of 2.6 the peak daily flow is projected to be 1.5 MGD. Please refer to the appendix of this report for individual basin flow estimates.

3) Maximum and minimum slope and velocity

Plans are currently conceptual; pipe slopes and velocities will be determined with the final design.

4) Available existing downstream capacity

Based on available information outfalls #1 and #3 should have sufficient downstream capacity to serve the proposed development and will require offsite improvements to get to the existing sewer infrastructure. Outfall #2 may slightly exceed the Town's capacity criteria. During Final design a variance may be requested.

WATER

1) Layout and connection to Town Potable water System

The North Westerly Development will draw its potable water from pressure Zone 3 of the Town's system. Connections to the existing potable water system will be in several locations including connections to the existing 12-inch water main in CR5, the existing 30-inch water main in Erie Parkway, and a soon to be constructed 24-inch water main in CR7. Please refer to Appendix B of this report for the conceptual utility map.

2) Potable water demand (peak and average)

The estimated max day and peak hour potable water design flows are 2.2 MGD and 4.5 MGD respectively. Please refer to the appendix for calculations.

3) Fire flow demand

The North Westerly development will contain commercial property. Therefore, a 3,500 GPM fire flow is required.

4) Peak instantaneous demand and meter sizing

Plans are currently conceptual. Meter sizes will be determined during final design.

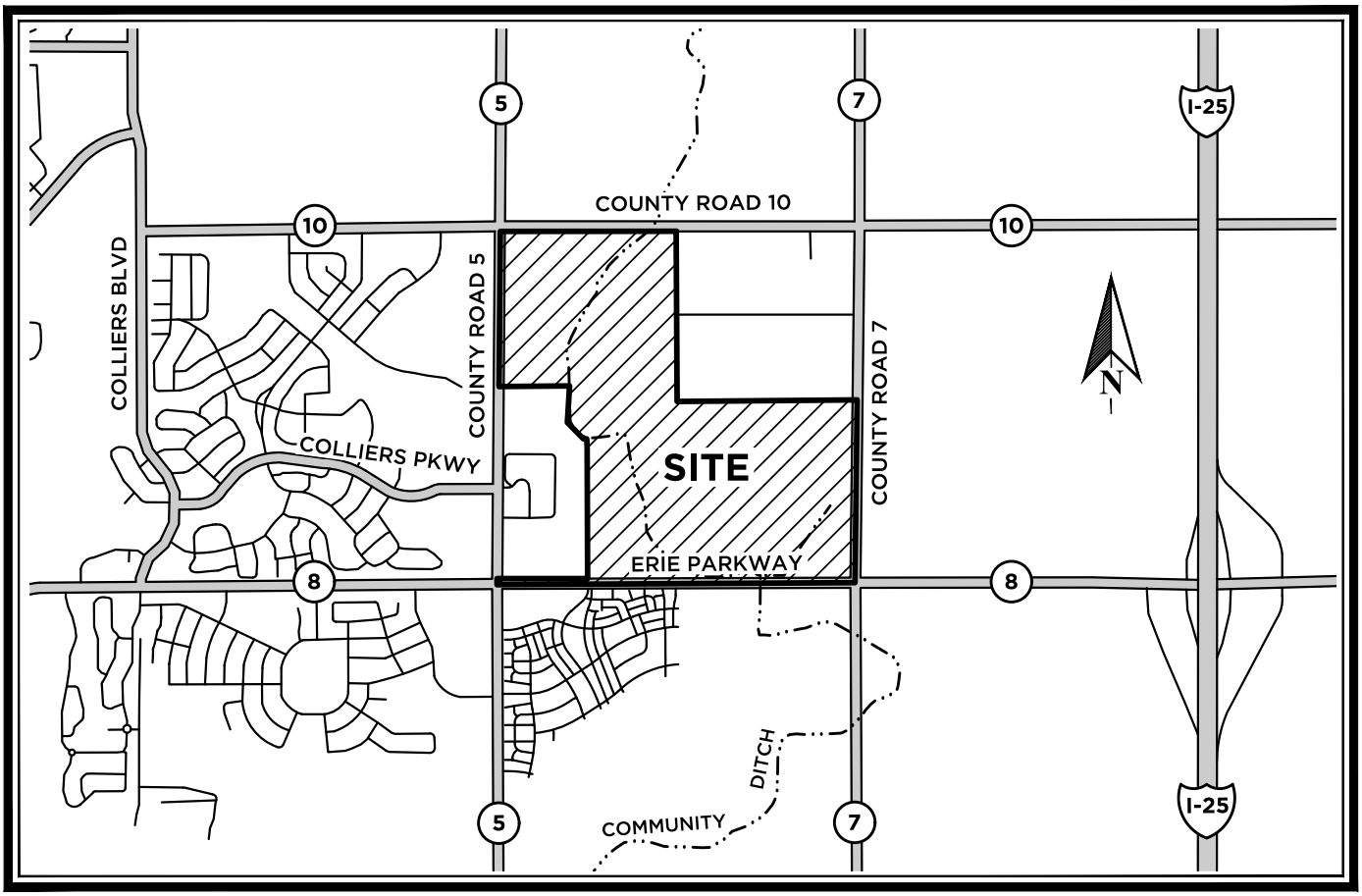
5) Available pressure and capacity

Sufficient pressure and capacity have been confirmed by the Town Engineering staff.

6) Irrigation water demand

North Westerly's Open space that requires irrigation is approximately 117 acres resulting in approximately 273 acre-feet annually. Please refer to the appendix for calculations.

APPENDIX A

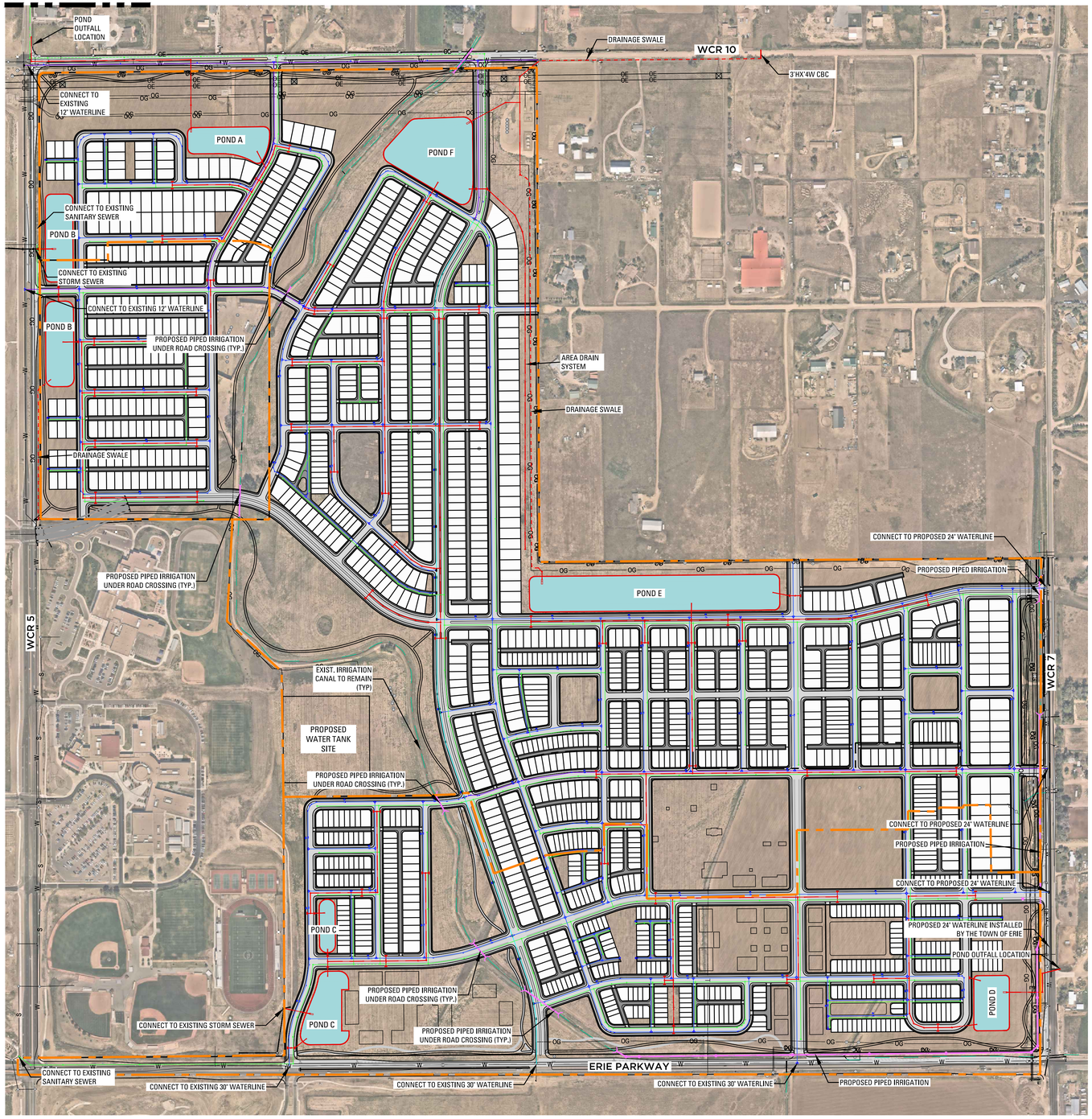


VICINITY MAP

1" = 2000'

APPENDIX B

SEE OFFSITE SAN TO RIGHT



MATCHLINE- SEE BELOW

MATCHLINE- SEE ABOVE

LEGEND

- 8" WATERLINE
- 12" WATERLINE
- 16" WATERLINE
- SANITARY SEWER
- STORM SEWER
- PROPOSED DRAINAGE SWALE
- EXISTING CENTERLINE COMMUNITY DITCH
- FIRE HYDRANT
- SANITARY MANHOLE
- STORM MANHOLE
- TYPE 'R' INLET
- AREA INLET
- OVERHEAD ELECTRIC
- CONCEPTUAL SANITARY SEWER BASINS
- IRRIGATION PIPE
- IRRIGATION MANHOLE

N

300 0 150 300 600

SCALE: 1"= 300 ' HORIZ.

J:\0099\2216\CIVIL\EXHIBITS\PRELIMINARY UTILITY\2216-PRELIM-OVERALL-UT.dwg

KT ENGINEERING

12500 W. 58TH AVE. #230
ARVADA, CO 80002

P: 720.638.5190

WWW.KTENG.NET

PREPARED FOR:
SLB

REVISIONS:

NO.	REVISION DESCRIPTION	DATE	BY
1.	TOWN COMMENTS	05-31-2024	EST
2.	TOWN COMMENTS	10-02-2024	EST
3.	TOWN COMMENTS	02-14-2025	KPT
4.	TOWN COMMENTS	03-24-2025	KPT
5.	#####	#####	#####
6.	#####	#####	#####
7.			
8.			

STAMP:

SHEET INFO:

NORTH WESTERLY

UTILITY CONCEPT MAP

PROJECT NO:
0099-2216

DRAWN BY:
EST

DESIGNED BY:
KPT

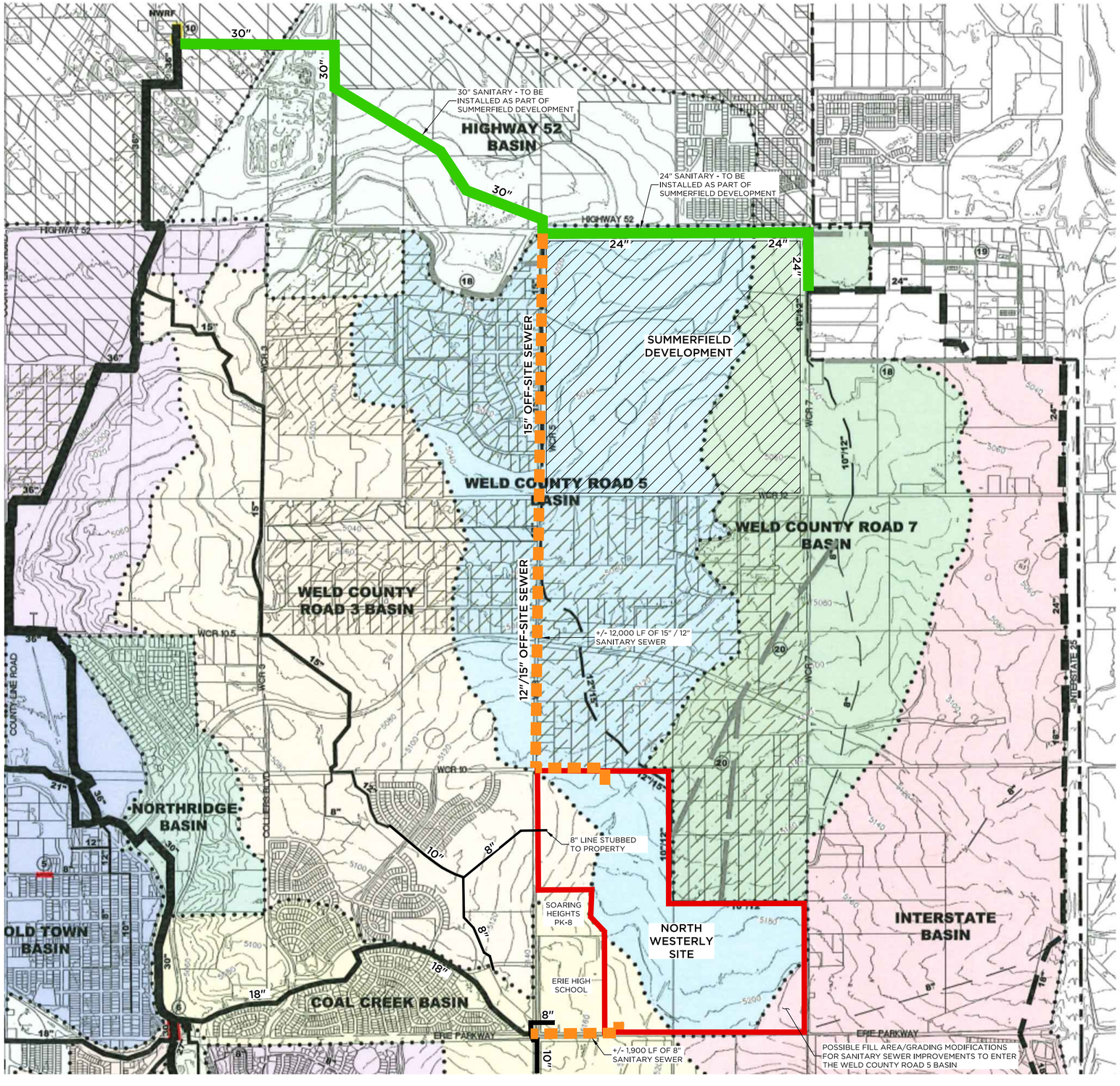
SCALE:
1" = 300'

SUBMITTED ON:
01-26-2024

NORTH WESTERLY

OFF-SITE SANITARY SEWER EXHIBIT

DATE: 10/14/22



SANITARY SEWER MAP LEGEND

- NORTH WESTERLY SITE BOUNDARY
- SANITARY SEWER IMPROVEMENTS TO BE CONSTRUCTED WITH SUMMERFIELD DEVELOPMENT
- WESTERLY NORTH OFF-SITE SANITARY SEWER IMPROVEMENTS

N

1000 0 500 1000 2000

SCALE: 1"=1000 ' HORIZ.

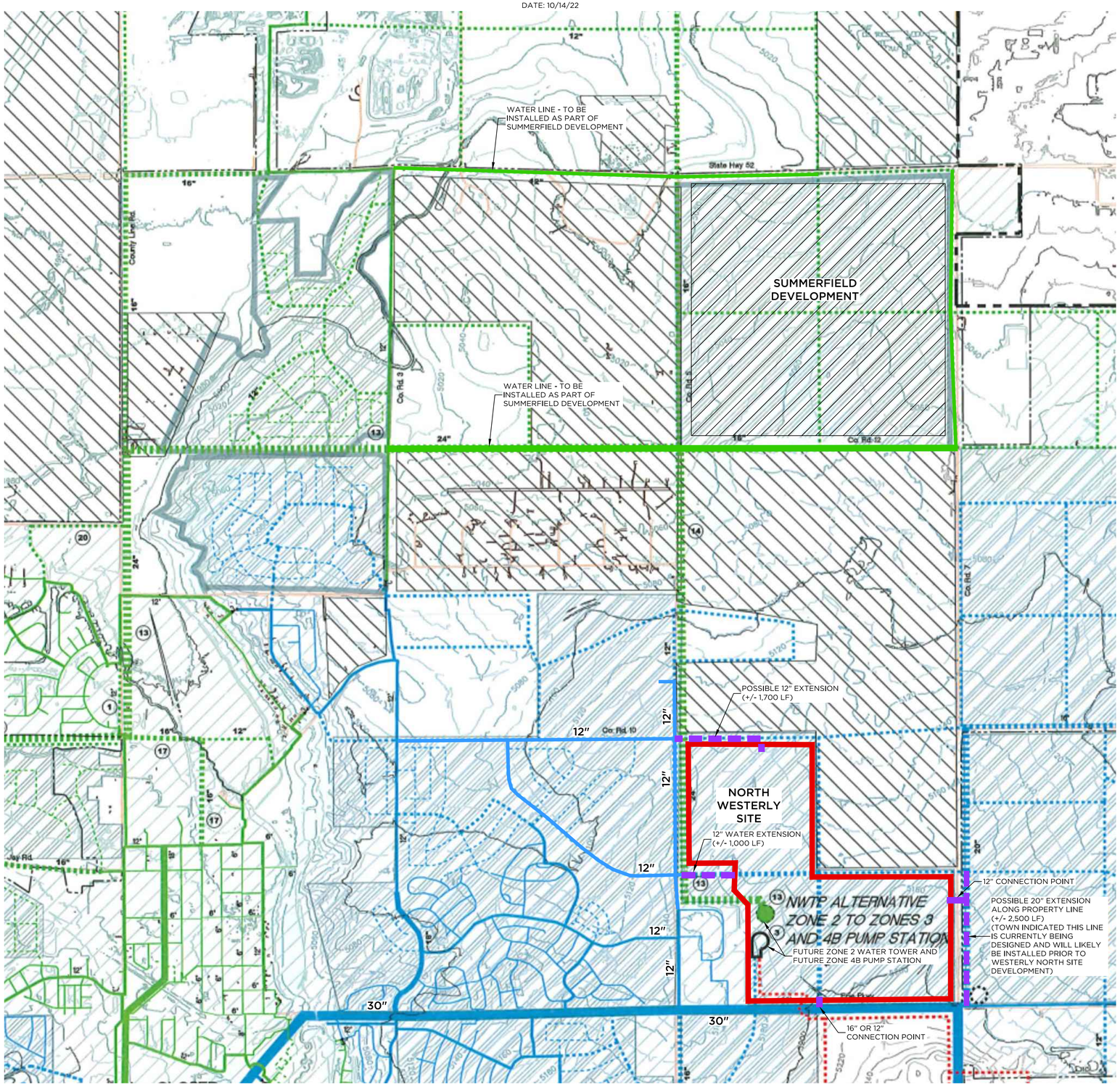
KT ENGINEERING
ENGINEERS • SURVEYORS
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

J:\0089216\CIVIL\EXHIBITS\PRELIMINARY UTILITY\216-PRELIM-UT.DWG

NORTH WESTERLY

OFF-SITE WATER EXHIBIT

DATE: 10/14/22



SANITARY SEWER MAP LEGEND

- NORTH WESTERLY SITE BOUNDARY
- ZONE 2 - TOWN OF ERIE INSTALLED OR TO BE INSTALLED WATER LINE
- ZONE 2 - TOWN OF ERIE FUTURE WATER LINE
- ZONE 3 - TOWN OF ERIE INSTALLED OR TO BE INSTALLED WATER LINE
- ZONE 3 - TOWN OF ERIE FUTURE WATER LINE
- NORTH WESTERLY OFF-SITE WATER LINE IMPROVEMENTS

N

1000 0 500 1000 2000

SCALE: 1"=1000 ' HORIZ.

KT ENGINEERING
ENGINEERS • SURVEYORS
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

J:\3099.27\6\CIVIL\EXHIBITS\PRELIMINARY UTILITY\27216-PRELIM-UT.DWG

APPENDIX C

Conceptual Wastewater Design Flows

Land Use	Equivalent Residential Units (EQR)	Population Density (persons/unit)	Flow (GPD/capita)	Average Daily Flow (GPD)	Average Daily Flow (cfs)	Peak Day Factor (2.6/Qavg ^-.16)	Peak Daily Flow (GPD)	Peak Flow (cfs)
Outfall #1								
Residential	813	2.89	90	211,461	0.327	3.1	657,413	1.02
Commercial (150,000 SF @ 0.15 GAL / SF)	87	2.89	90	22,629	0.035	4.0	90,515	0.14
Basin Total	900	2.89	90	234,090	0.362	3.1	716,022	1.11
Outfall #2								
Residential	200	2.89	90	52,020	0.080	3.9	202,408	0.31
Basin Total	200	2.89	90	52,020	0.080	3.9	202,408	0.31
Outfall #3								
Residential	1133	2.89	90	294,693	0.456	2.9	868,792	1.34
Basin Total	1133	2.89	90	294,693	0.456	2.9	868,792	1.34
Project Total	**2233**	**2.89**	**90**	**580,803**	**0.899**	**2.6**	**1,536,134**	**2.38**

APPENDIX D

Potable Water Design Flows

Land Use	Single Family Equivalent (SFE)	Flow - Max Day (GPD/SFE)	Max Day Flow (GPD)	Peak Hour Flow Ratio	Peak Hour Flow (GPD)
Residential	2146	1000	2,146,000	2.0	4,292,000
Commercial	87	1000	87,000	2.0	174,000
Project Total	**2233**		**2,233,000**		**4,466,000**

Irrigation

Land Use	Area (Acres)	Use Rate (ac-ft)*	Total Use (ac-ft)
Open Space	117	2.33	273

*Usage Rate Assumptions

1" of water applied per week

7 month water season