

## **Agency and Department Review Comments for Conditional Use Permit Case CU-130-23**

### **Commerce City Public Works**

***Ben Gonzales, Development Review & Coordination Engineer, [bgonzales@c3gov.com](mailto:bgonzales@c3gov.com)***

*Response Dated April 11, 2023:*

Public Works has reviewed the submittal for the conditional use permit and has no comment on this. At this time, Public Works is only requesting further information regarding the no rise analysis for the floodplain permit and plat (conducted under separate review permits).

The City Engineer approved and stamped traffic variances and these are included with the traffic report attached.

### **Commerce City Police Department**

***Greg Sadar, Deputy Chief, [gsadar@c3gov.com](mailto:gsadar@c3gov.com)***

*Response Dated December 14, 2022:*

The Police Department requested a response to concerns about protections in place to avoid stolen copper wires and other motor vehicle parts. The applicant responded noting that these are not the materials being recycled at this facility. The facility will be secured with chain link fencing and gates with barbed wire.

### **South Adams County Fire Department**

***Randall Weigum, Division Chief of Fire Prevention/Fire Marshal, [rweigum@sacfd.org](mailto:rweigum@sacfd.org)***

*Response Dated July 2022:*

Per communication between planning staff and Chief Weigum, South Adams County Fire Department has no objection to the conditional use permit moving forward. All changes on the development plan were addressed in the initial two reviews.

### **South Adams County Water and Sanitation District**

***Jeff Nelson, Development Review Supervisor, [jnelson@sacwsd.org](mailto:jnelson@sacwsd.org)***

*Response Dated March 17, 2023:*

Per communication between planning staff and Jeff Nelson, South Adams County Water and Sanitation District has no objection to the conditional use permit application moving forward. They have noted that the site may be required to engineer and construct offsite utilities to serve their project due to the location and proximity to existing utilities.

### **Xcel Energy**

***Donna George, Right of Way and Permits, [donna.l.george@xcelenergy.com](mailto:donna.l.george@xcelenergy.com)***

*Response Dated March 15, 2022:*

*Xcel Energy does not have any comments about the conditional use permit. The agency: requests that any activity including grading, proposed landscaping, erosion control or similar activities involving our existing right-of-way will require PSCo approval.*

PSCo is requesting that, prior to any final approval of the plat, it is the responsibility of the property owner/developer/contractor to contact PSCo's Encroachment Team for development plan review and execution of a License Agreement (upload all files in PDF format) at: [https://www.xcelenergy.com/encroachment\\_application](https://www.xcelenergy.com/encroachment_application) (click Colorado if necessary). An engineer will then be in contact to request specific plan sheets. Please see the attached Exhibit B for more information.

**Mile High Flood District**

**Derek Clark, Project Engineer, [dclark@mhfd.org](mailto:dclark@mhfd.org)**

*Response Dated January 2023:*

Per communication between planning staff and the MHFD project engineer, MHFD has no comment concerning the conditional use permit and development plan. They are continuing to work with Public Works on the floodplain permit and final plat.

**CDOT**

**Steve Loeffler, Permits Unit – Region 1, [steve.loeffler@state.co.us](mailto:steve.loeffler@state.co.us)**

**Per communication between staff and CDOT, CDOT does not have any further comments pertaining to the conditional use permit. The following was stated by the resident engineer:**

3/29/23 AMP - E. 60th Ave is within CDOT's ROW in front of that parcel. CDOT has no plans for any changes to width or alignment of E. 60th Ave. as part of the future I-270 reconstruction, however, the upcoming I-270 bridge replacement may have to-be-determined temporary or permanent impacts. Katie Dawson, PM for the bridge replacements project, has been added to this review for further comments.

3/29/23 kdd - At the present time, I do not foresee any impacts to this property from the Critical Bridge Replacements Project. We are in the scoping phase of the project, and that may change as the design progresses.

CDOT's drainage engineer is requesting construction plans for improvements proposed within the CDOT right-of-way.

**Commerce City Parks, Recreation, and Golf**

**Traci Ferguson, Parks Planner, [tferguson@c3gov.com](mailto:tferguson@c3gov.com)**

See attached response dated April 6, 2023.

**TCHD (now Adams County Health)**

See attached responses from Kathy Boyer, Warren Brown (TCHD) and Megan Grant (ADCo) for comments and statements about the use and the references to following local, state and federal regulations for recycling facilities.



April 12, 2023

Elizabeth Tart  
7887 E. 60th Ave.  
Commerce City, CO 80022  
(303) 227-8782

Subject: 4150 60<sup>th</sup> Avenue, Waste Connections – 5<sup>th</sup> Submittal Comments  
**CU-130-23, S-817-23**

Dear Libby:

Commerce City Public Works has reviewed the submitted Documents for the subject project. Review comments are as follows:

1. Development Plans – No comments.
2. Plat – Repeat Comment, “Please submit a working AutoCad dwg file.”
3. Traffic Report – Please include in the report the City Engineer stamped approved traffic variances.
4. Preliminary Drainage Report – Not resubmitted with 5<sup>th</sup> Submittal. Please include PDR in the next submittal addressing 4<sup>th</sup> submittal comments.
5. No-Rise Analysis Letter
  - a. Insert approved Drainage Variance to allow Trash/Recycling facilities.
  - b. Page 2: Proposed elimination of Retention Pond #1 is not allowed.
  - c. Page 2: Proposed regrading of existing retention ponds and/or within Sand Creek is not allowed.
  - d. See image below for redline comments to page 3 of the No-Rise Letter.

regarded with positive drainage away from the proposed building such that flood flows will not accumulate.

**No-Rise Analysis**

What were the changes, if any, to the Duplicate Effective Model to recreate the Effective Model?

Should this update statement be for the Corrected Effective model?

JR Engineering has evaluated the effects of the proposed development on the Sand Creek floodplain using the effective LOMR modeling as a baseline. The modeling was obtained in HEC-RAS format from MHFD. A Duplicate Effective model was created by re-running the HEC-RAS model.

A Duplicate Effective Model was updated by incorporating geo-referenced data and updated downstream reach lengths to create the Corrected Effective Model.

The Corrected Effective Model was updated by incorporating the existing site topography for the 4150 E 60<sup>th</sup> Ave property, surveyed by JR Engineering in August 2021, to create the Existing Conditions model. The topographic survey utilized a NGS monument as a benchmark (NAVD88 datum).

- e. In accordance with City of Commerce City Storm Drainage Criteria Manual, Section 4.5, "A floodplain development permit is required prior to commencement of any construction, development activity, or storage of materials within the floodplain overlay district."

If you have any questions, please feel free to contact me via email at [bgonzales@c3gov.com](mailto:bgonzales@c3gov.com) or by phone at 720-670-0261 to discuss any of these comments.

Sincerely,



Benjamin Gonzales, P.E.  
Commerce City, Development Review Engineer & Coordination

Enclosures: (none)

cc: Joe Wilson, City Public Works Director  
Shawn Poe, City Engineer  
Chris Hodyl, Development Review Manager  
Jennifer Jones, City Planning

**Variance Letters Approved by the City Engineer**



October 21, 2022



**J·R ENGINEERING**

Mr. Shawn Poe, City Engineer  
City of Commerce City  
8602 Rosemary Street  
Commerce City, CO 80022

**Re: Traffic Variance Letter for 4150 E 60<sup>th</sup> Avenue Traffic Impact Study (Waste Connections US) in Commerce City, CO dated October 17, 2022  
Intersection: Brighton Boulevard & E 60<sup>th</sup> Avenue**

The purpose of this letter is to request a design variance for the intersection of Brighton Boulevard & E 60<sup>th</sup> Avenue. This intersection does not comply with *Commerce City Construction Standards and Specifications*, which specifies a level of service (LOS) E or lower as unsatisfactory in a traffic impact study (TIS). We understand from the Public Works department that other relatively recent City-approved developments creating higher peak and daily traffic loads at this intersection than this project, and also confirming an unsatisfactory LOS, were not required to submit a Traffic Variance Letter. It is understood that submittal of a Traffic Variance Letter is a recent requirement.

According to the *HCM 6<sup>th</sup> Edition* Synchro reports, the intersection of Brighton & 60<sup>th</sup> (E2) is expected to operate satisfactorily in the Year 2024, except for the following:

- SEBLTR in the AM peak hour (LOS F)
- NWBLTR in the AM and PM peak hours (LOS F)

These failures occur in both the background traffic and opening day traffic scenarios; they are not caused by site generated traffic. These failures occur due to the relatively high volume on Brighton Boulevard as a 2-lane road. No roadway improvements have been recommended by the City nor CDOT.

Additionally, this industrial project adds 13 vehicles in the AM peak hour and 14 vehicles in the PM peak hour at Brighton & 60<sup>th</sup>, which are increases of 1.1% and 1.4% compared to the background traffic, respectively. JR views this increase as an insignificant impact to the overall performance of the intersection.

Therefore, JR recommends approving this variance at the intersection of Brighton Boulevard & E 60<sup>th</sup> Avenue.

If you have any questions or comments, please feel free to contact me at  
efarney@jreengineering.com or 303-267-6183.

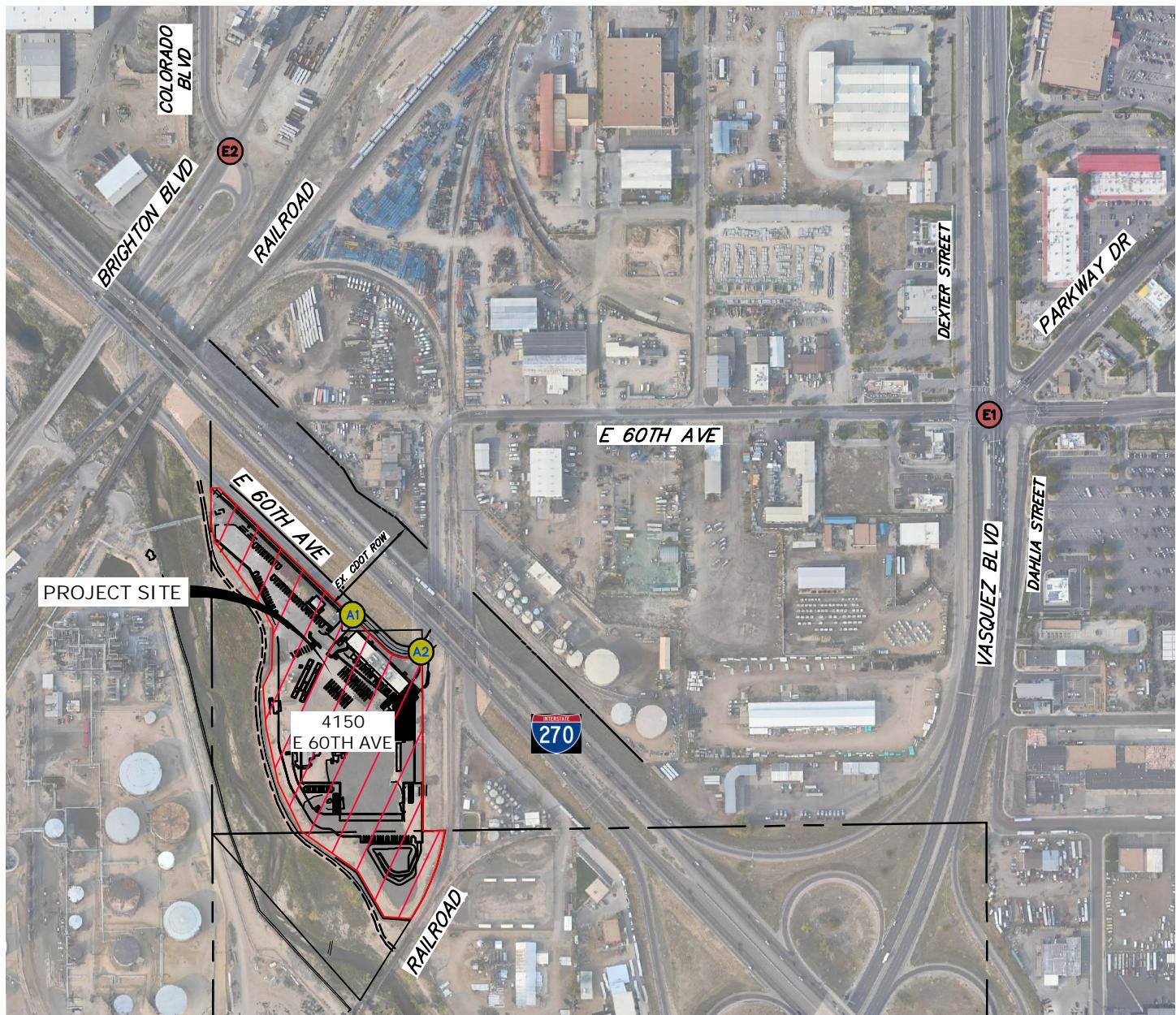
Sincerely,  
JR Engineering, LLC



Eli Farney, PE, PTOE  
Director of Public Works

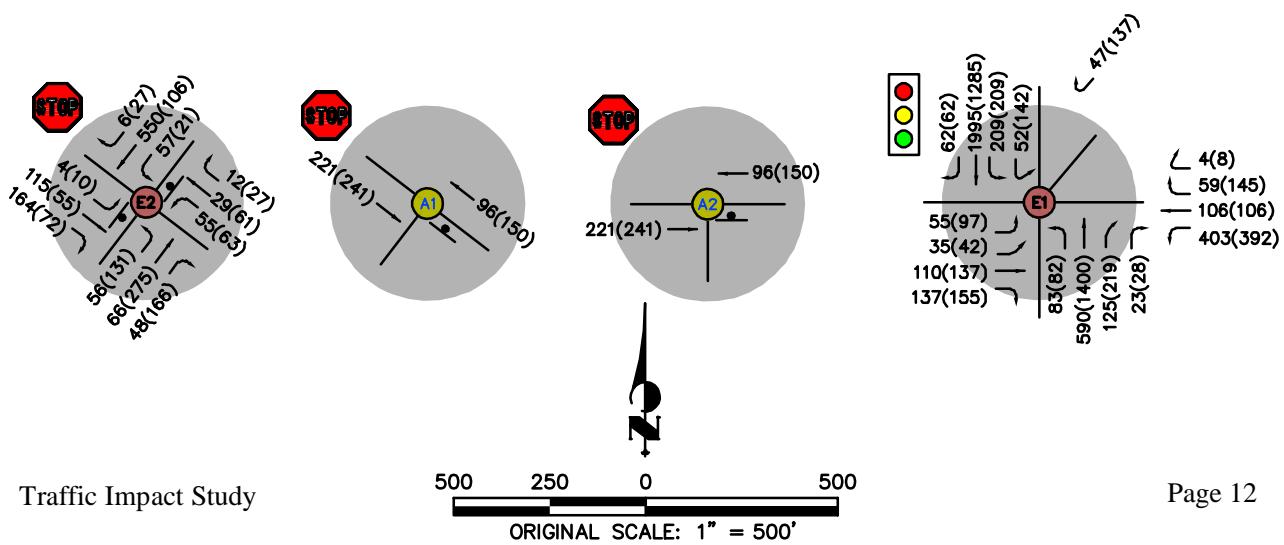
Attachments:

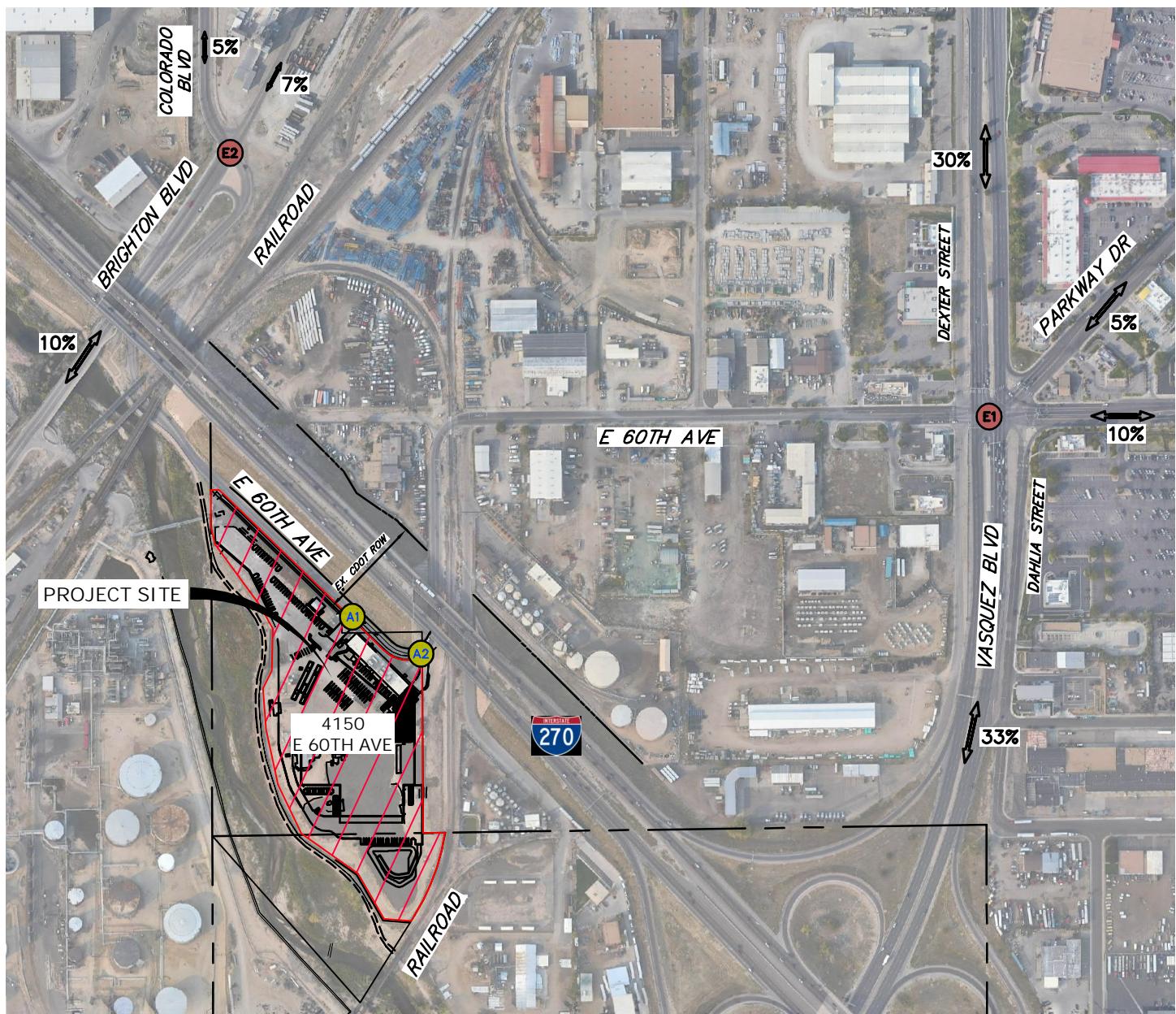
- TIS Figures 5-7 – Year 2024 Background, Site Generated, and Opening Day Traffic
- *HCM 6<sup>th</sup> Edition* Synchro Reports: Year 2024 at Brighton & 60<sup>th</sup>



## LEGEND

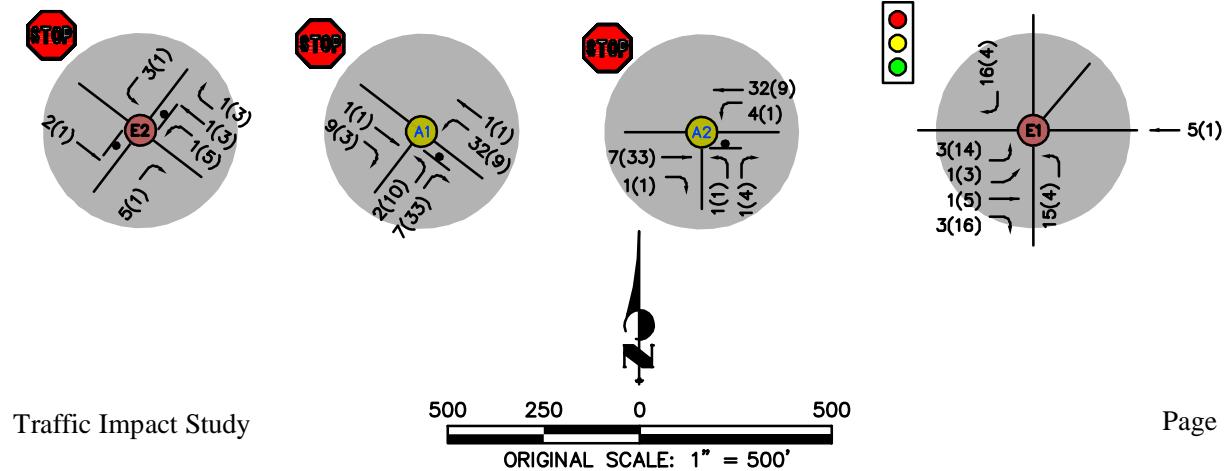
- EXISTING INTERSECTION
- ACCESS INTERSECTION
- PROJECT SITE
- XX (XX) AM (PM) PEAK HOUR TRIP DISTRIBUTION
- EX. CDT ROW
- EXISTING MOVEMENT

Figure 5 - Year 2024  
Background Traffic



## LEGEND

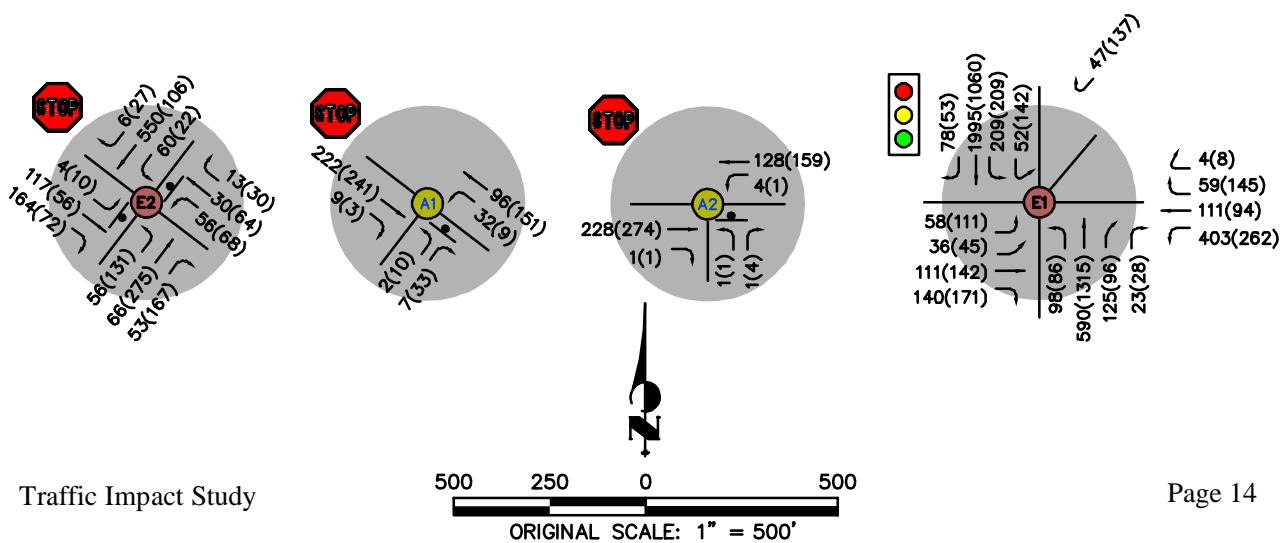
- EXISTING INTERSECTION
- ACCESS INTERSECTION
- EXISTING MOVEMENT
- PROJECT SITE
- XX (XX) AM (PM) PEAK HOUR TRIP DISTRIBUTION
- ↔ DISTRIBUTION OF SITE GENERATED TRAFFIC

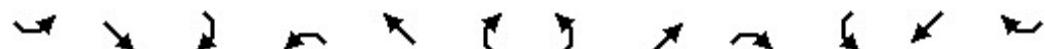




## LEGEND

- EXISTING INTERSECTION
- ACCESS INTERSECTION
- PROJECT SITE
- XX (XX) AM (PM) PEAK HOUR TRIP DISTRIBUTION
- EX. CDT ROW
- EXISTING MOVEMENT

Figure 7 - Year 2024  
Opening Day Traffic



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	4	115	164	55	29	12	58	66	48	57	550	6
Future Volume (vph)	4	115	164	55	29	12	58	66	48	57	550	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	125		100	0	0	0
Storage Lanes	0		0	0		0	1		1	0	0	0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.923			0.984				0.850		0.998	
Flt Protected		0.999			0.972		0.950				0.995	
Satd. Flow (prot)	0	1685	0	0	1747	0	1736	1827	1553	0	1814	0
Flt Permitted		0.999			0.972		0.950				0.995	
Satd. Flow (perm)	0	1685	0	0	1747	0	1736	1827	1553	0	1814	0
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		105			128			1020			460	
Travel Time (s)		2.0			2.9			19.9			9.0	
Peak Hour Factor	0.78	0.83	0.85	0.78	0.78	0.78	0.78	0.79	0.78	0.78	0.92	0.78
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	5	139	193	71	37	15	74	84	62	73	598	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	337	0	0	123	0	74	84	62	0	679	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

#### Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 70.8% ICU Level of Service C

Analysis Period (min) 15

Intersection

Int Delay, s/veh 71.3

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	4	115	164	55	29	12	58	66	48	57	550	6
Future Vol, veh/h	4	115	164	55	29	12	58	66	48	57	550	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	125	-	100	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	83	85	78	78	78	78	79	78	78	92	78
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	5	139	193	71	37	15	74	84	62	73	598	8

Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	1006	980	602	1146	984	84	606	0	0	84	0	0
Stage 1	748	748	-	232	232	-	-	-	-	-	-	-
Stage 2	258	232	-	914	752	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.236	-	-	2.236	-	-
Pot Cap-1 Maneuver	218	248	496	175	246	970	962	-	-	1500	-	-
Stage 1	401	417	-	766	709	-	-	-	-	-	-	-
Stage 2	742	709	-	325	415	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	165	212	496	~46	211	970	962	-	-	1500	-	-
Mov Cap-2 Maneuver	165	212	-	~46	211	-	-	-	-	-	-	-
Stage 1	370	387	-	707	654	-	-	-	-	-	-	-
Stage 2	636	654	-	118	385	-	-	-	-	-	-	-

Approach	SE	NW			NE			SW				
HCM Control Delay, s	108.8	\$ 479.2			3.1			0.8				
HCM LOS	F	F										
Minor Lane/Major Mvmt	NEL	NET	NER	NWL	Ln1 SEL	Ln1	SWL	SWT	SWR			
Capacity (veh/h)	962	-	-	71	314	1500	-	-				
HCM Lane V/C Ratio	0.077	-	-	1.733	1.072	0.049	-	-				
HCM Control Delay (s)	9.1	-	-	\$ 479.2	108.8	7.5	0	-				
HCM Lane LOS	A	-	-	F	F	A	A	-				
HCM 95th %tile Q(veh)	0.3	-	-	10.8	12.7	0.2	-	-				

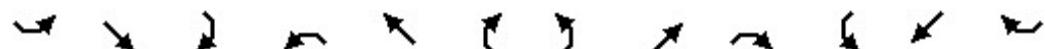
Notes

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

Lanes, Volumes, Timings  
2: Brighton Blvd & 60th Ave/Colorado Blvd

JR Engineering

10/11/2022



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	10	55	72	63	61	27	131	275	166	21	106	27
Future Volume (vph)	10	55	72	63	61	27	131	275	166	21	106	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	125		100	0	0	0
Storage Lanes	0		0	0		0	1		1	0	0	0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.930			0.975				0.850		0.975	
Flt Protected		0.996			0.980		0.950				0.993	
Satd. Flow (prot)	0	1660	0	0	1713	0	1703	1792	1524	0	1735	0
Flt Permitted		0.996			0.980		0.950				0.993	
Satd. Flow (perm)	0	1660	0	0	1713	0	1703	1792	1524	0	1735	0
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		105			128			1020			460	
Travel Time (s)		2.0			2.9			19.9			9.0	
Peak Hour Factor	0.78	0.78	0.80	0.79	0.79	0.78	0.84	0.88	0.85	0.78	0.83	0.78
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Adj. Flow (vph)	13	71	90	80	77	35	156	313	195	27	128	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	174	0	0	192	0	156	313	195	0	190	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	52.4%							ICU Level of Service A				
Analysis Period (min)	15											

Intersection

Int Delay, s/veh 15.1

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	10	55	72	63	61	27	131	275	166	21	106	27
Future Vol, veh/h	10	55	72	63	61	27	131	275	166	21	106	27
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	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	125	-	100	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	80	79	79	78	84	88	85	78	83	78
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	13	71	90	80	77	35	156	313	195	27	128	35

Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	881	825	146	905	842	313	163	0	0	313	0	0
Stage 1	200	200	-	625	625	-	-	-	-	-	-	-
Stage 2	681	625	-	280	217	-	-	-	-	-	-	-
Critical Hdwy	7.16	6.56	6.26	7.16	6.56	6.26	4.16	-	-	4.16	-	-
Critical Hdwy Stg 1	6.16	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.16	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.554	4.054	3.354	3.554	4.054	3.354	2.254	-	-	2.254	-	-
Pot Cap-1 Maneuver	263	303	891	253	296	718	1392	-	-	1225	-	-
Stage 1	793	728	-	466	471	-	-	-	-	-	-	-
Stage 2	434	471	-	718	716	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	174	263	891	163	257	718	1392	-	-	1225	-	-
Mov Cap-2 Maneuver	174	263	-	163	257	-	-	-	-	-	-	-
Stage 1	704	711	-	414	418	-	-	-	-	-	-	-
Stage 2	299	418	-	568	699	-	-	-	-	-	-	-

Approach	SE	NW			NE		SW		
HCM Control Delay, s	21.3	69.2			1.9		1.1		
HCM LOS	C	F							
<hr/>									
Minor Lane/Major Mvmt	NEL	NET	NER	NWL	n1 SEL	n1	SWL	SWT	SWR
Capacity (veh/h)	1392	-	-	229	391	1225	-	-	-
HCM Lane V/C Ratio	0.112	-	-	0.837	0.443	0.022	-	-	-
HCM Control Delay (s)	7.9	-	-	69.2	21.3	8	0	-	-
HCM Lane LOS	A	-	-	F	C	A	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	6.5	2.2	0.1	-	-	-

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	4	117	164	56	30	13	56	66	53	60	550	6
Future Volume (vph)	4	117	164	56	30	13	56	66	53	60	550	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	125		100	0	0	0
Storage Lanes	0		0	0		0	1		1	0	0	0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.923			0.982				0.850		0.998	
Flt Protected		0.999			0.972		0.950				0.994	
Satd. Flow (prot)	0	1685	0	0	1744	0	1736	1827	1553	0	1812	0
Flt Permitted		0.999			0.972		0.950				0.994	
Satd. Flow (perm)	0	1685	0	0	1744	0	1736	1827	1553	0	1812	0
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		105			128			1020			460	
Travel Time (s)		2.0			2.9			19.9			9.0	
Peak Hour Factor	0.78	0.83	0.85	0.78	0.78	0.78	0.78	0.79	0.78	0.79	0.92	0.78
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	5	141	193	72	38	17	72	84	68	76	598	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	339	0	0	127	0	72	84	68	0	682	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	71.2%							ICU Level of Service C				
Analysis Period (min)	15											

Intersection

Int Delay, s/veh 78.1

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	4	117	164	56	30	13	56	66	53	60	550	6
Future Vol, veh/h	4	117	164	56	30	13	56	66	53	60	550	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	125	-	100	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	83	85	78	78	78	78	79	78	79	92	78
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	5	141	193	72	38	17	72	84	68	76	598	8

Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	1010	982	602	1149	986	84	606	0	0	84	0	0
Stage 1	754	754	-	228	228	-	-	-	-	-	-	-
Stage 2	256	228	-	921	758	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.236	-	-	2.236	-	-
Pot Cap-1 Maneuver	217	247	496	174	246	970	962	-	-	1500	-	-
Stage 1	398	414	-	770	712	-	-	-	-	-	-	-
Stage 2	744	712	-	322	412	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	163	211	496	~44	210	970	962	-	-	1500	-	-
Mov Cap-2 Maneuver	163	211	-	~44	210	-	-	-	-	-	-	-
Stage 1	368	383	-	712	659	-	-	-	-	-	-	-
Stage 2	637	659	-	115	381	-	-	-	-	-	-	-

Approach	SE	NW			NE			SW				
HCM Control Delay, s	114.9	\$ 526.9			2.9			0.8				
HCM LOS	F	F										
Minor Lane/Major Mvmt	NEL	NET	NER	NWL	Ln1 SEL	Ln1	SWL	SWT	SWR			
Capacity (veh/h)	962	-	-	69	311	1500	-	-				
HCM Lane V/C Ratio	0.075	-	-	1.839	1.09	0.051	-	-				
HCM Control Delay (s)	9	-	-	\$ 526.9	114.9	7.5	0	-				
HCM Lane LOS	A	-	-	F	F	A	A	-				
HCM 95th %tile Q(veh)	0.2	-	-	11.4	13.2	0.2	-	-				

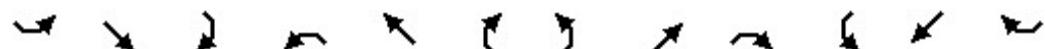
Notes

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

Lanes, Volumes, Timings  
2: Brighton Blvd & 60th Ave/Colorado Blvd

JR Engineering

10/11/2022



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	10	56	72	68	64	30	131	275	167	22	106	27
Future Volume (vph)	10	56	72	68	64	30	131	275	167	22	106	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	0	125	100	0	0	0	0
Storage Lanes	0	0	0	0	0	0	1	1	1	0	0	0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.931			0.975				0.850		0.975	
Flt Protected		0.996			0.979		0.950				0.993	
Satd. Flow (prot)	0	1662	0	0	1711	0	1703	1792	1524	0	1735	0
Flt Permitted		0.996			0.979		0.950				0.993	
Satd. Flow (perm)	0	1662	0	0	1711	0	1703	1792	1524	0	1735	0
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		105			128			1020			460	
Travel Time (s)		2.0			2.9			19.9			9.0	
Peak Hour Factor	0.78	0.78	0.80	0.79	0.79	0.78	0.84	0.88	0.85	0.78	0.83	0.78
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Adj. Flow (vph)	13	72	90	86	81	38	156	313	196	28	128	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	175	0	0	205	0	156	313	196	0	191	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 53.1%

Analysis Period (min) 15

Intersection

Int Delay, s/veh 18

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	10	56	72	68	64	30	131	275	167	22	106	27
Future Vol, veh/h	10	56	72	68	64	30	131	275	167	22	106	27
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	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	125	-	100	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	80	79	79	78	84	88	85	78	83	78
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	13	72	90	86	81	38	156	313	196	28	128	35

Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	887	827	146	908	844	313	163	0	0	313	0	0
Stage 1	202	202	-	625	625	-	-	-	-	-	-	-
Stage 2	685	625	-	283	219	-	-	-	-	-	-	-
Critical Hdwy	7.16	6.56	6.26	7.16	6.56	6.26	4.16	-	-	4.16	-	-
Critical Hdwy Stg 1	6.16	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.16	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.554	4.054	3.354	3.554	4.054	3.354	2.254	-	-	2.254	-	-
Pot Cap-1 Maneuver	260	302	891	252	296	718	1392	-	-	1225	-	-
Stage 1	791	727	-	466	471	-	-	-	-	-	-	-
Stage 2	432	471	-	715	714	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	168	262	891	161	256	718	1392	-	-	1225	-	-
Mov Cap-2 Maneuver	168	262	-	161	256	-	-	-	-	-	-	-
Stage 1	702	709	-	414	418	-	-	-	-	-	-	-
Stage 2	293	418	-	563	696	-	-	-	-	-	-	-

Approach	SE	NW			NE			SW		
HCM Control Delay, s	21.7	82.8			1.9			1.2		
HCM LOS	C	F								
Minor Lane/Major Mvmt	NEL	NET	NER	NWL	NLn1	SELn1	SWL	SWT	SWR	
Capacity (veh/h)	1392	-	-	227	387	1225	-	-	-	
HCM Lane V/C Ratio	0.112	-	-	0.906	0.451	0.023	-	-	-	
HCM Control Delay (s)	7.9	-	-	82.8	21.7	8	0	-	-	
HCM Lane LOS	A	-	-	F	C	A	A	-	-	
HCM 95th %tile Q(veh)	0.4	-	-	7.5	2.3	0.1	-	-	-	



October 21, 2022



J·R ENGINEERING

Mr. Shawn Poe, City Engineer  
City of Commerce City  
8602 Rosemary Street  
Commerce City, CO 80022

**Re: Traffic Variance Letter for 4150 E 60<sup>th</sup> Avenue Traffic Impact Study (Waste Connections US) in Commerce City, CO dated October 17, 2022  
Intersection: Vasquez Boulevard & E 60<sup>th</sup> Avenue**

The purpose of this letter is to request a design variance for the intersection of Vasquez Boulevard & E 60<sup>th</sup> Avenue. This intersection does not comply with *Commerce City Construction Standards and Specifications*, which specifies a level of service (LOS) E or lower as unsatisfactory in a traffic impact study (TIS). We understand from the Public Works department that other relatively recent City-approved developments creating higher peak and daily traffic loads at this intersection than this project, and also confirming an unsatisfactory LOS, were not required to submit a Traffic Variance Letter. It is understood that submittal of a Traffic Variance Letter is a recent requirement.

According to the *HCM 2000* Synchro reports for a 5-leg intersection, the intersection of Vasquez & 60<sup>th</sup> (E1) is expected to operate satisfactorily in the Year 2024, except for the following:

- EBL in the AM peak hour (LOS E)
- EBTR in the AM peak hour (LOS E)
- WBL in the AM and PM peak hours (LOS F and E, respectively)
- SBL1 in the AM and PM peak hours (LOS E, both)

These failures occur in both the background traffic and opening day traffic scenarios. These LOS are based on the assumption that CDOT intersection improvements will occur by Year 2024, including restricted movements from the 5<sup>th</sup> leg of Parkway Drive and the adjacent Dexter Street. If these improvements do not occur by Year 2024, then the LOS would have similar failures to the Year 2021 existing condition. Either way, the LOS failures are not caused by site generated traffic.

Additionally, as shown in Table 5 of the TIS, the increase of delay in the peak hours are less than 2%. As defined by Adams County Development Standards and Regulations section 8-02-06-06-02, “significance is defined as... when the short term or long term horizon year traffic without the project exceeds the established [LOS] threshold, and the project traffic causes a 2% increase in the volume/capacity ratio or delay.”

Therefore, JR recommends approving this variance at the intersection of Vasquez Boulevard & E 60<sup>th</sup> Avenue.

If you have any questions or comments, please feel free to contact me at  
efarney@jreengineering.com or 303-267-6183.

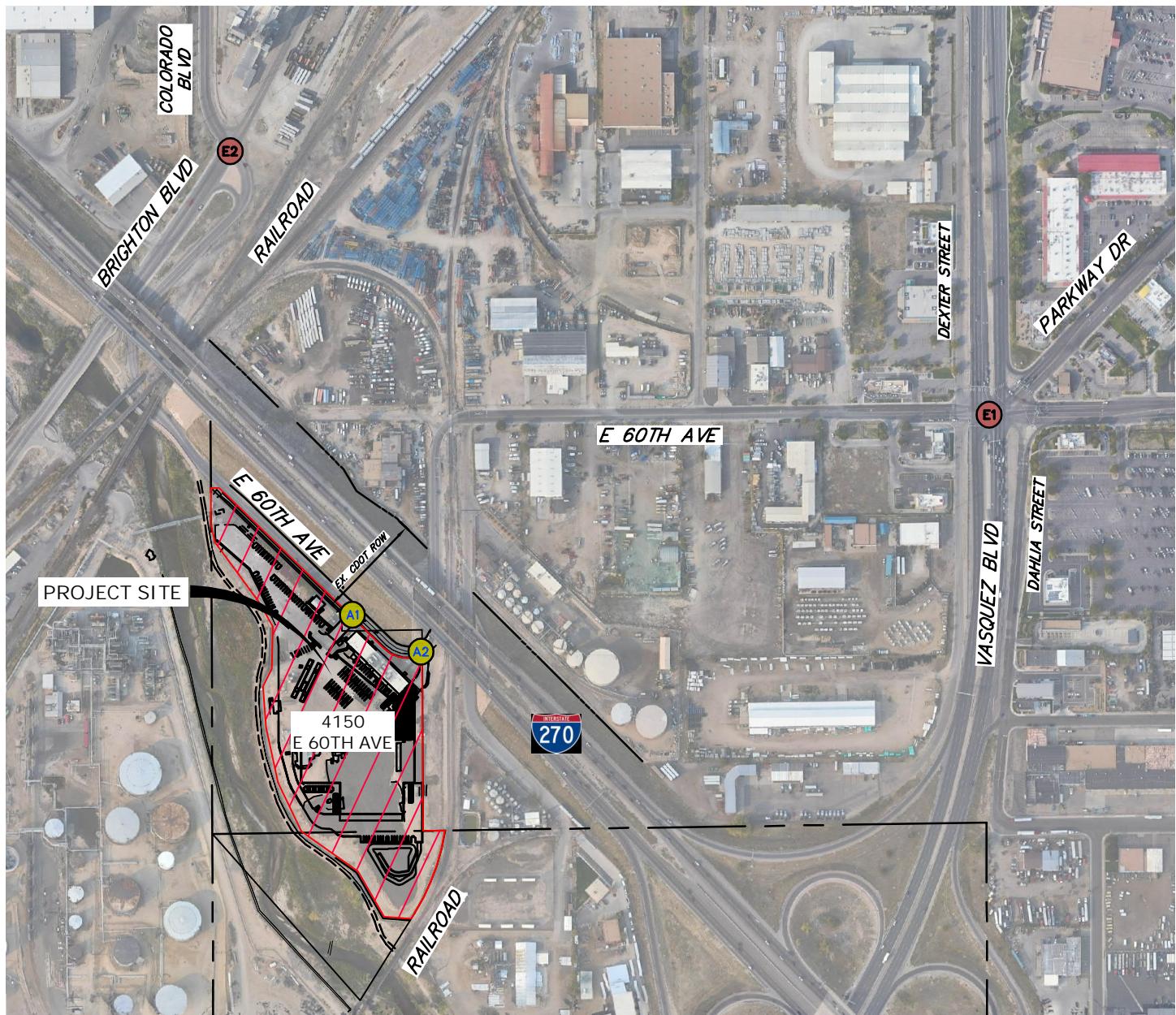
Sincerely,  
JR Engineering, LLC



Eli Farney, PE, PTOE  
Director of Public Works

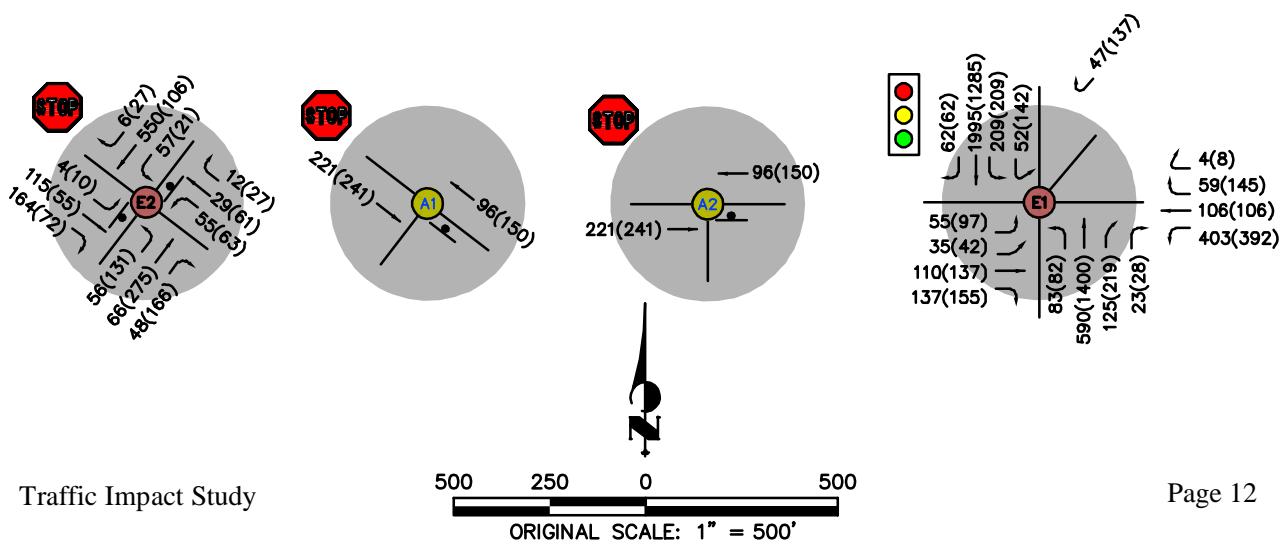
Attachments:

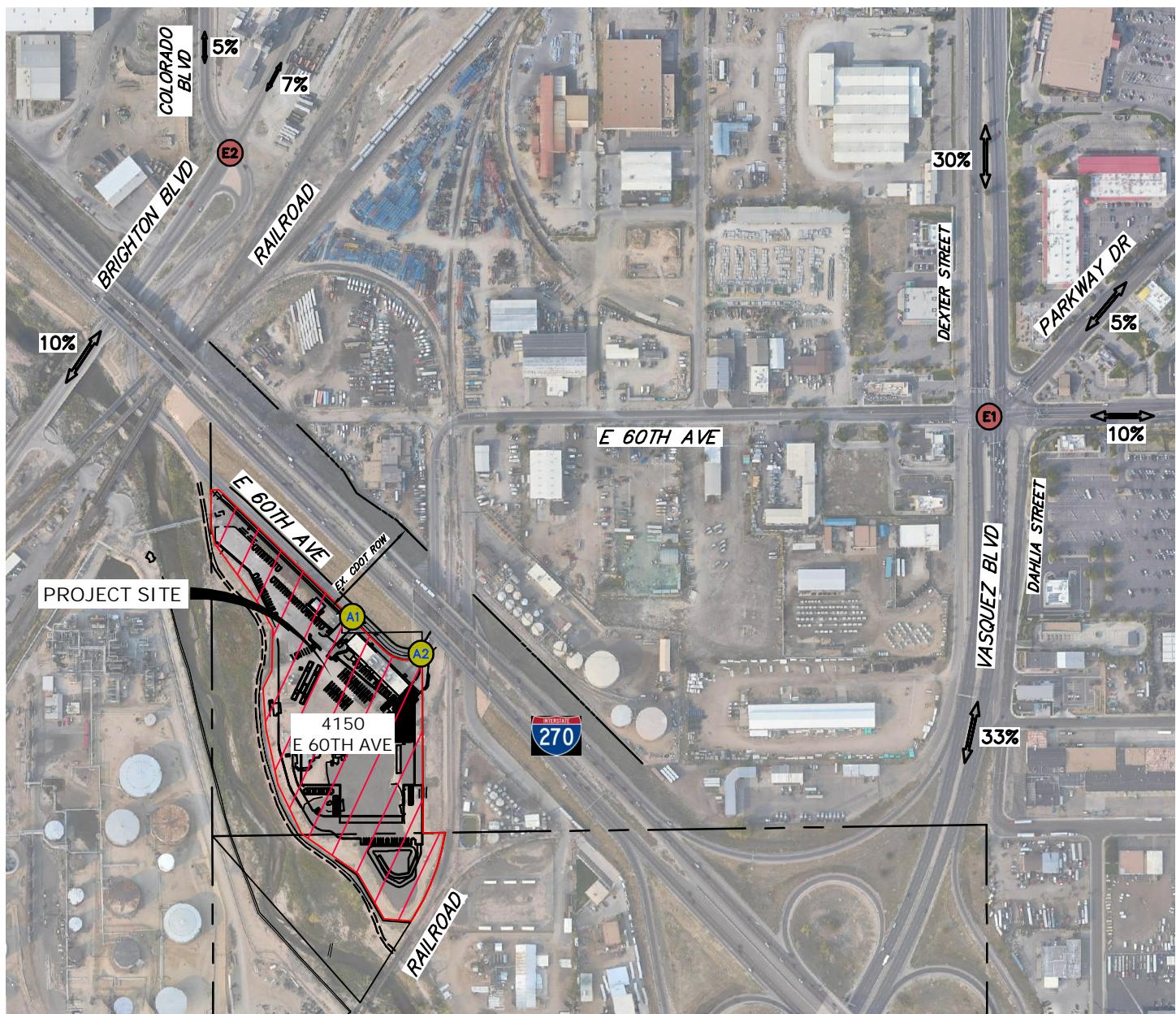
- TIS Figures 5-7 – Year 2024 Background, Site Generated, and Opening Day Traffic
- TIS Table 5 – LOS for Year 2024 Traffic
- *HCM 2000* Synchro Reports: Year 2024 at Vasquez & 60<sup>th</sup>



## LEGEND

- EXISTING INTERSECTION
- ACCESS INTERSECTION
- PROJECT SITE
- XX (XX) AM (PM) PEAK HOUR TRIP DISTRIBUTION
- EX. CDT ROW
- EXISTING MOVEMENT

Figure 5 - Year 2024  
Background Traffic



## LEGEND

- EXISTING INTERSECTION
- ACCESS INTERSECTION
- EXISTING MOVEMENT
- PROJECT SITE
- XX (XX) AM (PM) PEAK HOUR TRIP DISTRIBUTION
- ↔ DISTRIBUTION OF SITE GENERATED TRAFFIC

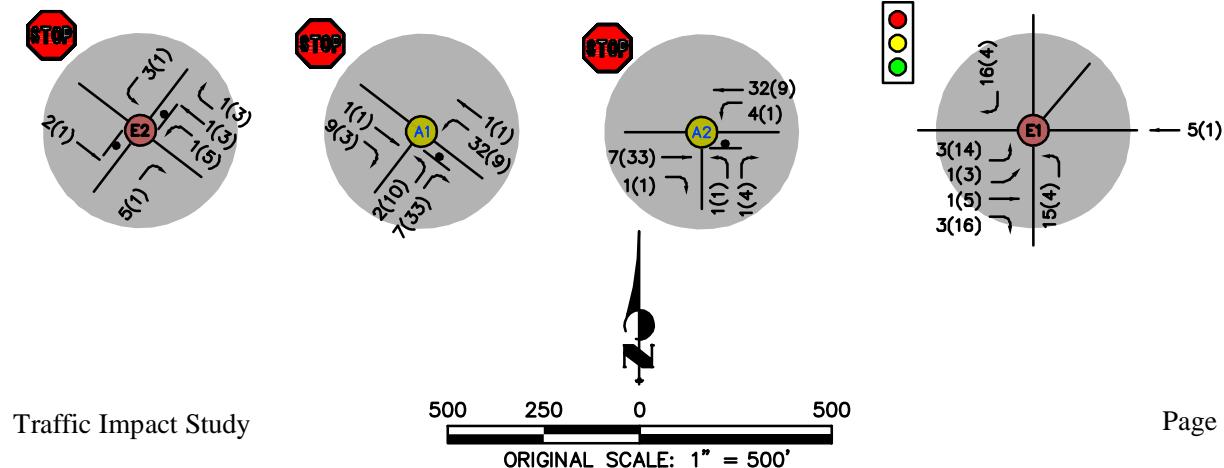
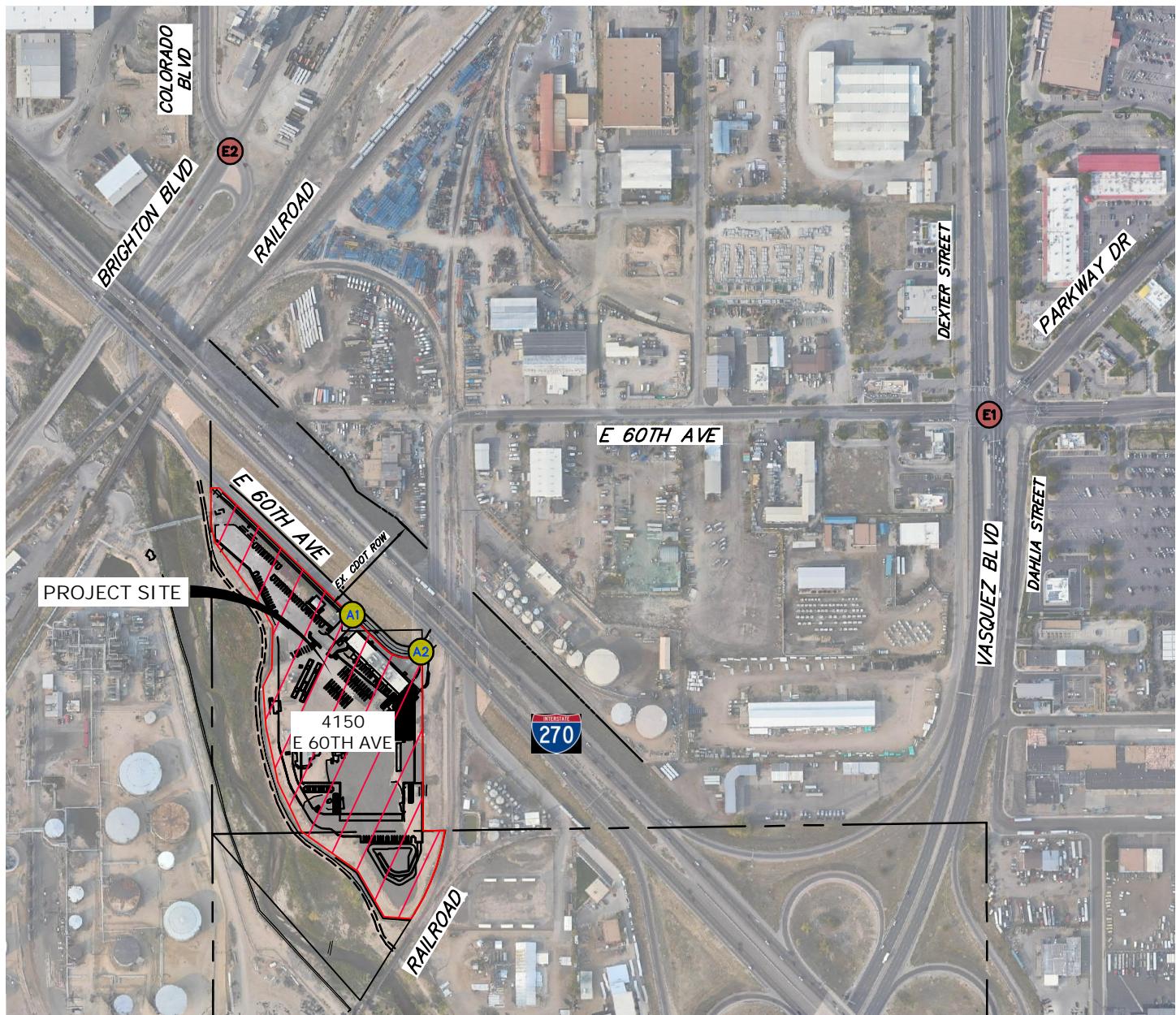
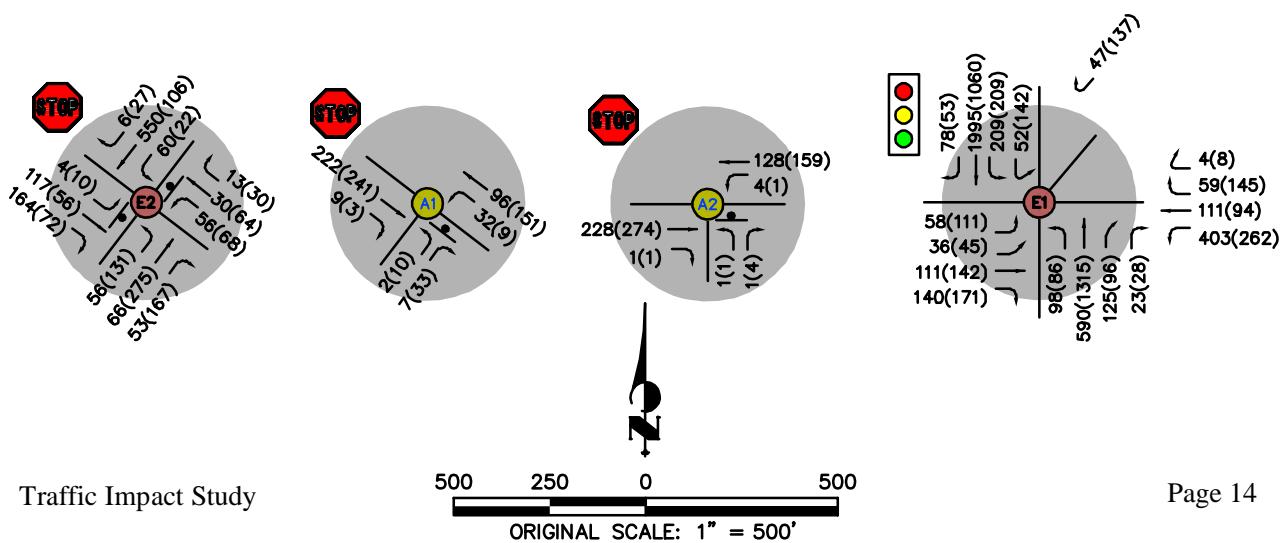


Figure 6 - Year 2024  
Assignment of Site Generated Traffic



## LEGEND

- EXISTING INTERSECTION
- ACCESS INTERSECTION
- PROJECT SITE
- XX (XX) AM (PM) PEAK HOUR TRIP DISTRIBUTION
- EX. CDT ROW
- EXISTING MOVEMENT

Figure 7 - Year 2024  
Opening Day Traffic

Regarding the intersection of Brighton & 60<sup>th</sup> (E2), the vacant site at 4150 E 60<sup>th</sup> Avenue does not cause to these failures. Therefore, Waste Connections should not be responsible for potential intersection improvements.

## Analysis of Year 2024

Traffic analysis of the Year 2024 was also performed using Synchro and the *HCM 6<sup>th</sup> Edition/HCM 2000*. As stated previously, short term improvements include restricted movements from Parkway Drive and Dexter Street. The volumes approaching from Parkway Drive were rerouted through Vasquez and 60<sup>th</sup>. The signal timing was adjusted as well. The projected traffic volumes were input and the LOS results are summarized in **Table 5**. The LOS reports are included in **Appendix C**.

**Table 5 – LOS for Year 2024 Traffic**

Signalized Intersection	Movement	Background Traffic LOS		Opening Day Traffic LOS	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
E1 - Vasquez Boulevard & E 60th Avenue/Parkway Drive	EBL	E	D	E	D
	EBTR	E	D	E	D
	WBL	F	E	F	E
	WBT	D	D	D	D
	WBR	D	D	D	D
	NBL	D	C	D	C
	NBT	C	C	C	C
	NBR	C	C	C	C
	SBL1	E	E	E	E
	SBL2	D	D	D	D
	SBTR	D	C	D	C
	SWBTR	B	B	B	B
<b>Overall</b>		<b>D</b>	<b>D</b>	<b>D</b>	<b>D</b>
<b>Delay (sec)</b>		<b>43.9</b>	<b>36.6</b>	<b>44.7 (+1.8%)</b>	<b>37.1 (+1.4%)</b>
<b>TWSC Intersection</b>					
E2 - Brighton Boulevard & E 60th Avenue/ Colorado Boulevard	SEBLTR	F	C	F	C
	NWBLTR	F	F	F	F
	NEBL	A	A	A	A
	SWBLTR	A	A	A	A
A1 - 60th Avenue & Access 1	NWBLT	N/A	N/A	A	A
	NEBLR	N/A	N/A	B	B
A2 - 60th Avenue & Access 2	WBLT	N/A	N/A	A	A
	NBLR	N/A	N/A	B	B

**Notes:**

1. EB=Eastbound, WB=Westbound, NB=Northbound, SB=Southbound, SEB=Southeast-Bound, NWB=Northwest-Bound, NEB-Northeast-Bound, SWB=Southwest-Bound

2. N/A=Not Applicable

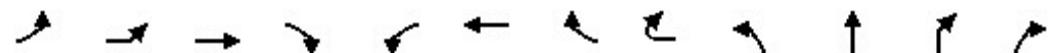
3. L=Left, R=Right, T=Through

4. Yellow highlight exceeds Established Threshold of LOS D

Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	55	35	110	137	403	106	59	4	83	590	125	23
Future Volume (vph)	55	35	110	137	403	106	59	4	83	590	125	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)					0	100	220	0	220	220	220	
Storage Lanes					1	0	2	1	2	2	1	
Taper Length (ft)					25		25		25			
Lane Util. Factor	0.95	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.97	0.91	1.00	0.91
Fr <sub>t</sub>					0.917			0.850				0.850
Flt Protected					0.950			0.950		0.950		
Satd. Flow (prot)	0	1687	3094	0	3273	1776	1509	0	3273	4848	1509	0
Flt Permitted					0.950			0.950		0.950		
Satd. Flow (perm)	0	1687	3094	0	3273	1776	1509	0	3273	4848	1509	0
Right Turn on Red					Yes			Yes				Yes
Satd. Flow (RTOR)					163			173				127
Link Speed (mph)					35			35				45
Link Distance (ft)					480			1479				649
Travel Time (s)					9.4			28.8				9.8
Peak Hour Factor	0.78	0.78	0.83	0.84	0.90	0.83	0.78	0.78	0.81	0.92	0.84	0.78
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Adj. Flow (vph)	71	45	133	163	448	128	76	5	102	641	149	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	116	296	0	448	128	81	0	102	641	178	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Left	Right	Left	Left	Right	Right	Left	Left	Right	Right
Median Width(ft)					24			24				24
Link Offset(ft)					0			0				0
Crosswalk Width(ft)					16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	15		9	15		9	9	15		9	9
Number of Detectors	1	1	1		1	1	1		1	1	1	
Detector Template	Left	Left	Thru		Left	Thru	Right		Left	Thru	Right	
Leading Detector (ft)	20	40	40		40	40	40		40	40	40	
Trailing Detector (ft)	0	0	0		0	0	0		0	0	0	
Detector 1 Position(ft)	0	0	0		0	0	0		0	0	0	
Detector 1 Size(ft)	20	40	40		40	40	40		40	40	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	
Turn Type	Prot	Prot	NA		Prot	NA	Perm		Prot	NA	Perm	
Protected Phases	7	7	4		3	8			5	2		
Permitted Phases							8				2	
Detector Phase	7	7	4		3	8	8		5	2	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	8.0		5.0	8.0	8.0		5.0	15.0	15.0	
Minimum Split (s)	10.0	10.0	16.0		10.0	16.0	16.0		23.0	34.0	34.0	



Lane Group	SBL2	SBL	SBT	SBR	SWR2
Lane Configurations					
Traffic Volume (vph)	52	209	1995	62	47
Future Volume (vph)	52	209	1995	62	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Storage Length (ft)		220		0	
Storage Lanes		2		0	
Taper Length (ft)		25			
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00
Fr <sub>t</sub>			0.995		0.865
Flt Protected	0.950	0.950			
Satd. Flow (prot)	1687	1687	4823	0	1536
Flt Permitted	0.950	0.950			
Satd. Flow (perm)	1687	1687	4823	0	1536
Right Turn on Red			Yes	Yes	
Satd. Flow (RTOR)			6		293
Link Speed (mph)			45		
Link Distance (ft)			1000		
Travel Time (s)			15.2		
Peak Hour Factor	0.78	0.87	0.95	0.79	0.78
Heavy Vehicles (%)	7%	7%	7%	7%	7%
Adj. Flow (vph)	67	240	2100	78	60
Shared Lane Traffic (%)					
Lane Group Flow (vph)	67	240	2178	0	60
Enter Blocked Intersection	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Right
Median Width(ft)			24		
Link Offset(ft)			0		
Crosswalk Width(ft)			16		
Two way Left Turn Lane					
Headway Factor	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	15		9	9
Number of Detectors	1	1	1		1
Detector Template	Left	Left	Thru		Right
Leading Detector (ft)	40	40	40		20
Trailing Detector (ft)	0	0	0		0
Detector 1 Position(ft)	0	0	0		0
Detector 1 Size(ft)	40	40	40		20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel					
Detector 1 Extend (s)	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0
Turn Type	Prot	Prot	NA		Perm
Protected Phases	1	1	6		
Permitted Phases				6	
Detector Phase	1	1	6		6
Switch Phase					
Minimum Initial (s)	5.0	5.0	15.0		15.0
Minimum Split (s)	12.0	12.0	21.0		21.0



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Total Split (s)	17.0	17.0	16.0		21.0	20.0	20.0		23.0	51.0	51.0	
Total Split (%)	14.2%	14.2%	13.3%		17.5%	16.7%	16.7%		19.2%	42.5%	42.5%	
Maximum Green (s)	12.0	12.0	9.0		16.0	13.0	13.0		18.0	45.0	45.0	
Yellow Time (s)	3.0	3.0	4.0		3.0	4.0	4.0		3.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	3.0		2.0	3.0	3.0		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	
Total Lost Time (s)	5.0	7.0			5.0	7.0	7.0		5.0	6.0	6.0	
Lead/Lag	Lead	Lead	Lag		Lead	Lag	Lag		Lag	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Recall Mode	None	None	None		None	None	None		None	Max	Max	
Act Effect Green (s)	11.1	8.8			16.0	13.7	13.7		12.1	45.5	45.5	
Actuated g/C Ratio	0.10	0.08			0.14	0.12	0.12		0.11	0.40	0.40	
v/c Ratio	0.71	0.76			0.98	0.60	0.24		0.29	0.33	0.26	
Control Delay	74.1	37.0			86.0	61.8	1.7		48.6	25.0	9.2	
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0	0.0	0.0	
Total Delay	74.1	37.0			86.0	61.8	1.7		48.6	25.0	9.2	
LOS	E	D			F	E	A		D	C	A	
Approach Delay		47.5				70.9				24.6		
Approach LOS		D				E				C		

#### Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 114.1

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 42.7

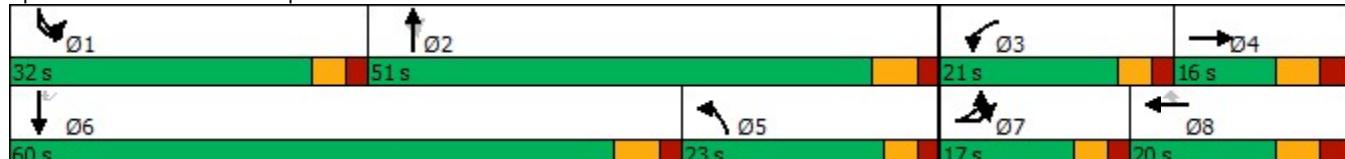
Intersection LOS: D

Intersection Capacity Utilization 82.2%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Vasquez Blvd & 60th Ave





Lane Group	SBL2	SBL	SBT	SBR	SWR2
Total Split (s)	32.0	32.0	60.0		60.0
Total Split (%)	26.7%	26.7%	50.0%		50.0%
Maximum Green (s)	27.0	27.0	54.0		54.0
Yellow Time (s)	3.0	3.0	4.0		4.0
All-Red Time (s)	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.0	5.0	6.0		6.0
Lead/Lag	Lead	Lead	Lead		Lead
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0	3.0		3.0
Recall Mode	None	None	Max		Max
Act Effect Green (s)	20.8	20.8	54.1		54.1
Actuated g/C Ratio	0.18	0.18	0.47		0.47
v/c Ratio	0.22	0.78	0.95		0.07
Control Delay	40.8	62.3	40.0		0.1
Queue Delay	0.0	0.0	0.0		0.0
Total Delay	40.8	62.3	40.0		0.1
LOS	D	E	D		A
Approach Delay			42.1		
Approach LOS			D		
Intersection Summary					



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBL	SBT	SWR2
Lane Group Flow (vph)	116	296	448	128	81	102	641	178	67	240	2178	60
v/c Ratio	0.71	0.76	0.98	0.60	0.24	0.29	0.33	0.26	0.22	0.78	0.95	0.07
Control Delay	74.1	37.0	86.0	61.8	1.7	48.6	25.0	9.2	40.8	62.3	40.0	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	74.1	37.0	86.0	61.8	1.7	48.6	25.0	9.2	40.8	62.3	40.0	0.1
Queue Length 50th (ft)	83	50	171	91	0	36	119	23	42	169	547	0
Queue Length 95th (ft)	130	87	#296	150	0	56	163	64	71	249	#739	0
Internal Link Dist (ft)		400		1399				569			920	
Turn Bay Length (ft)			220			220			220	220	220	150
Base Capacity (vph)	177	394	459	213	333	517	1931	677	400	400	2289	882
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	0.66	0.75	0.98	0.60	0.24	0.20	0.33	0.26	0.17	0.60	0.95	0.07

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
1: Vasquez Blvd & 60th Ave

JR Engineering

10/12/2022

Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	55	35	110	137	403	106	59	4	83	590	125	23
Future Volume (vph)	55	35	110	137	403	106	59	4	83	590	125	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	7.0		5.0	7.0	7.0		5.0	6.0	6.0		
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00		0.97	0.91	1.00		
Frt	1.00	0.92		1.00	1.00	0.85		1.00	1.00	0.85		
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.95	1.00	1.00		
Satd. Flow (prot)	1687	3095		3273	1776	1509		3273	4848	1509		
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.95	1.00	1.00		
Satd. Flow (perm)	1687	3095		3273	1776	1509		3273	4848	1509		
Peak-hour factor, PHF	0.78	0.78	0.83	0.84	0.90	0.83	0.78	0.78	0.81	0.92	0.84	0.78
Adj. Flow (vph)	71	45	133	163	448	128	76	5	102	641	149	29
RTOR Reduction (vph)	0	0	150	0	0	0	71	0	0	0	76	0
Lane Group Flow (vph)	0	116	146	0	448	128	10	0	102	641	102	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Prot	Prot	NA		Prot	NA	Perm		Prot	NA	Perm	
Protected Phases	7	7	4		3	8			5	2		
Permitted Phases							8				2	
Actuated Green, G (s)	11.1	8.8		16.0	13.7	13.7		12.2	45.5	45.5		
Effective Green, g (s)	11.1	8.8		16.0	13.7	13.7		12.2	45.5	45.5		
Actuated g/C Ratio	0.10	0.08		0.14	0.12	0.12		0.11	0.40	0.40		
Clearance Time (s)	5.0	7.0		5.0	7.0	7.0		5.0	6.0	6.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0		
Lane Grp Cap (vph)	164	238		458	213	181		349	1933	601		
v/s Ratio Prot	0.07	0.05		c0.14	c0.07			0.03	c0.13			
v/s Ratio Perm						0.01				0.07		
v/c Ratio	0.71	0.61		0.98	0.60	0.05		0.29	0.33	0.17		
Uniform Delay, d1	49.9	51.0		48.9	47.6	44.5		47.0	23.8	22.1		
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		
Incremental Delay, d2	13.0	4.6		36.0	4.7	0.1		0.5	0.5	0.6		
Delay (s)	63.0	55.6		84.8	52.3	44.6		47.4	24.2	22.7		
Level of Service	E	E		F	D	D		D	C	C		
Approach Delay (s)			57.7		73.5				26.5			
Approach LOS			E		E				C			
<b>Intersection Summary</b>												
HCM 2000 Control Delay	43.9											D
HCM 2000 Volume to Capacity ratio	0.85											
Actuated Cycle Length (s)	114.1											23.0
Intersection Capacity Utilization	82.2%											E
Analysis Period (min)	15											
c Critical Lane Group												

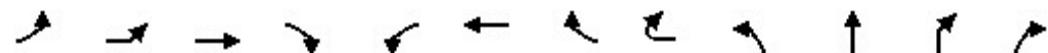


Movement	SBL2	SBL	SBT	SBR	SWR2
Lane Configurations	1	1	2	1	1
Traffic Volume (vph)	52	209	1995	62	47
Future Volume (vph)	52	209	1995	62	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	0.91	1.00	
Fr <sub>t</sub>	1.00	1.00	0.99	0.86	
Flt Protected	0.95	0.95	1.00	1.00	
Satd. Flow (prot)	1687	1687	4822	1536	
Flt Permitted	0.95	0.95	1.00	1.00	
Satd. Flow (perm)	1687	1687	4822	1536	
Peak-hour factor, PHF	0.78	0.87	0.95	0.79	0.78
Adj. Flow (vph)	67	240	2100	78	60
RTOR Reduction (vph)	0	0	3	0	32
Lane Group Flow (vph)	67	240	2175	0	28
Heavy Vehicles (%)	7%	7%	7%	7%	7%
Turn Type	Prot	Prot	NA		Perm
Protected Phases	1	1	6		
Permitted Phases					6
Actuated Green, G (s)	20.8	20.8	54.1	54.1	
Effective Green, g (s)	20.8	20.8	54.1	54.1	
Actuated g/C Ratio	0.18	0.18	0.47	0.47	
Clearance Time (s)	5.0	5.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	307	307	2286	728	
v/s Ratio Prot	0.04	0.14	c0.45		
v/s Ratio Perm				0.02	
v/c Ratio	0.22	0.78	0.95	0.04	
Uniform Delay, d1	39.7	44.5	28.7	16.1	
Progression Factor	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	12.2	10.4	0.1	
Delay (s)	40.1	56.7	39.2	16.2	
Level of Service	D	E	D	B	
Approach Delay (s)			40.9		
Approach LOS			D		
<b>Intersection Summary</b>					

	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	97	42	137	155	392	106	145	8	82	1400	219	28
Future Volume (vph)	97	42	137	155	392	106	145	8	82	1400	219	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0			100	220		0		220		220
Storage Lanes		1			0	2		1		2		1
Taper Length (ft)		25				25				25		
Lane Util. Factor	0.95	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.97	0.91	1.00	0.91
Fr <sub>t</sub>					0.921			0.850				0.850
Flt Protected					0.950			0.950				0.950
Satd. Flow (prot)	0	1752	3228	0	3400	1845	1568	0	3400	5036	1568	0
Flt Permitted		0.950				0.950				0.950		
Satd. Flow (perm)	0	1752	3228	0	3400	1845	1568	0	3400	5036	1568	0
Right Turn on Red					Yes			Yes				Yes
Satd. Flow (RTOR)					182			230				170
Link Speed (mph)					35			35				45
Link Distance (ft)					480			1479				649
Travel Time (s)					9.4			28.8				9.8
Peak Hour Factor	0.82	0.78	0.84	0.85	0.90	0.83	0.84	0.78	0.81	0.93	0.87	0.78
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	118	54	163	182	436	128	173	10	101	1505	252	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	172	345	0	436	128	183	0	101	1505	288	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Left	Right	Left	Left	Right	Right	Left	Left	Right	Right
Median Width(ft)					24			24				24
Link Offset(ft)					0			0				0
Crosswalk Width(ft)					16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	15		9	15		9	9	15		9	9
Number of Detectors	1	1	1		1	1	1		1	1	1	
Detector Template	Left	Left	Thru		Left	Thru	Right		Left	Thru	Right	
Leading Detector (ft)	20	40	40		40	40	40		40	40	40	
Trailing Detector (ft)	0	0	0		0	0	0		0	0	0	
Detector 1 Position(ft)	0	0	0		0	0	0		0	0	0	
Detector 1 Size(ft)	20	40	40		40	40	40		40	40	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	
Turn Type	Prot	Prot	NA		Prot	NA	Perm		Prot	NA	Perm	
Protected Phases	7	7	4		3	8			5	2		
Permitted Phases								8				2
Detector Phase	7	7	4		3	8	8		5	2	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	8.0		5.0	8.0	8.0		5.0	15.0	15.0	
Minimum Split (s)	10.0	10.0	16.0		10.0	16.0	16.0		23.0	34.0	34.0	



Lane Group	SBL2	SBL	SBT	SBR	SWR2
Lane Configurations					
Traffic Volume (vph)	142	209	1285	62	137
Future Volume (vph)	142	209	1285	62	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Storage Length (ft)		220		0	
Storage Lanes		2		0	
Taper Length (ft)		25			
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00
Fr <sub>t</sub>			0.992		0.865
Flt Protected	0.950	0.950			
Satd. Flow (prot)	1752	1752	4996	0	1596
Flt Permitted	0.950	0.950			
Satd. Flow (perm)	1752	1752	4996	0	1596
Right Turn on Red			Yes	Yes	
Satd. Flow (RTOR)			10		182
Link Speed (mph)			45		
Link Distance (ft)			1000		
Travel Time (s)			15.2		
Peak Hour Factor	0.84	0.87	0.93	0.79	0.84
Heavy Vehicles (%)	3%	3%	3%	3%	3%
Adj. Flow (vph)	169	240	1382	78	163
Shared Lane Traffic (%)					
Lane Group Flow (vph)	169	240	1460	0	163
Enter Blocked Intersection	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Right
Median Width(ft)			24		
Link Offset(ft)			0		
Crosswalk Width(ft)			16		
Two way Left Turn Lane					
Headway Factor	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	15		9	9
Number of Detectors	1	1	1		1
Detector Template	Left	Left	Thru		Right
Leading Detector (ft)	40	40	40		20
Trailing Detector (ft)	0	0	0		0
Detector 1 Position(ft)	0	0	0		0
Detector 1 Size(ft)	40	40	40		20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel					
Detector 1 Extend (s)	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0
Turn Type	Prot	Prot	NA		Perm
Protected Phases	1	1	6		
Permitted Phases				6	
Detector Phase	1	1	6		6
Switch Phase					
Minimum Initial (s)	5.0	5.0	15.0		15.0
Minimum Split (s)	12.0	12.0	21.0		21.0



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Total Split (s)	18.0	18.0	16.0		18.0	16.0	16.0		22.0	36.0	36.0	
Total Split (%)	20.0%	20.0%	17.8%		20.0%	17.8%	17.8%		24.4%	40.0%	40.0%	
Maximum Green (s)	13.0	13.0	9.0		13.0	9.0	9.0		17.0	30.0	30.0	
Yellow Time (s)	3.0	3.0	4.0		3.0	4.0	4.0		3.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	3.0		2.0	3.0	3.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.0	7.0	5.0		7.0	7.0	7.0		5.0	6.0	6.0	
Lead/Lag	Lead	Lead	Lag		Lead	Lag	Lag		Lag	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Recall Mode	None	None	None		None	None	None		None	Max	Max	
Act Effect Green (s)	12.0	8.7		13.0	9.7	9.7		14.7	30.0	30.0		
Actuated g/C Ratio	0.13	0.10		0.15	0.11	0.11		0.16	0.34	0.34		
v/c Ratio	0.73	0.72		0.88	0.64	0.49		0.18	0.89	0.45		
Control Delay	56.0	27.8		58.1	54.9	7.1		31.7	36.0	12.1		
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0		
Total Delay	56.0	27.8		58.1	54.9	7.1		31.7	36.0	12.1		
LOS	E	C		E	D	A		C	D	B		
Approach Delay		37.2			45.1				32.1			
Approach LOS		D			D				C			

#### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 89.1

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 35.5

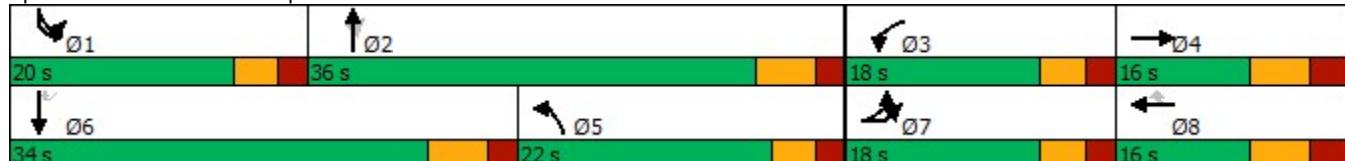
Intersection LOS: D

Intersection Capacity Utilization 77.7%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Vasquez Blvd & 60th Ave





Lane Group	SBL2	SBL	SBT	SBR	SWR2
Total Split (s)	20.0	20.0	34.0		34.0
Total Split (%)	22.2%	22.2%	37.8%		37.8%
Maximum Green (s)	15.0	15.0	28.0		28.0
Yellow Time (s)	3.0	3.0	4.0		4.0
All-Red Time (s)	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.0	5.0	6.0		6.0
Lead/Lag	Lead	Lead	Lead		Lead
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0	3.0		3.0
Recall Mode	None	None	Max		Max
Act Effect Green (s)	14.4	14.4	32.0		32.0
Actuated g/C Ratio	0.16	0.16	0.36		0.36
v/c Ratio	0.60	0.85	0.81		0.24
Control Delay	44.3	63.6	32.2		3.8
Queue Delay	0.0	0.0	0.0		0.0
Total Delay	44.3	63.6	32.2		3.8
LOS	D	E	C		A
Approach Delay			37.3		
Approach LOS			D		

Intersection Summary

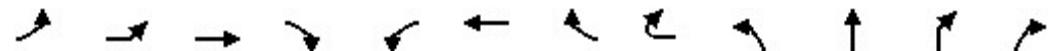


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBL	SBT	SWR2
Lane Group Flow (vph)	172	345	436	128	183	101	1505	288	169	240	1460	163
v/c Ratio	0.73	0.72	0.88	0.64	0.49	0.18	0.89	0.45	0.60	0.85	0.81	0.24
Control Delay	56.0	27.8	58.1	54.9	7.1	31.7	36.0	12.1	44.3	63.6	32.2	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.0	27.8	58.1	54.9	7.1	31.7	36.0	12.1	44.3	63.6	32.2	3.8
Queue Length 50th (ft)	94	46	127	72	0	24	294	48	90	133	291	0
Queue Length 95th (ft)	137	81	#210	#134	22	42	#384	109	143	#243	#389	27
Internal Link Dist (ft)		400		1399				569			920	
Turn Bay Length (ft)			220			220			220	220	220	150
Base Capacity (vph)	255	489	496	200	375	649	1695	641	295	295	1798	688
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	0.67	0.71	0.88	0.64	0.49	0.16	0.89	0.45	0.57	0.81	0.81	0.24

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	97	42	137	155	392	106	145	8	82	1400	219	28
Future Volume (vph)	97	42	137	155	392	106	145	8	82	1400	219	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	7.0		5.0	7.0	7.0		5.0	6.0	6.0	
Lane Util. Factor		1.00	0.95		0.97	1.00	1.00		0.97	0.91	1.00	
Frt		1.00	0.92		1.00	1.00	0.85		1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.95	1.00	1.00		0.95	1.00	1.00	
Satd. Flow (prot)		1752	3228		3400	1845	1568		3400	5036	1568	
Flt Permitted		0.95	1.00		0.95	1.00	1.00		0.95	1.00	1.00	
Satd. Flow (perm)		1752	3228		3400	1845	1568		3400	5036	1568	
Peak-hour factor, PHF	0.82	0.78	0.84	0.85	0.90	0.83	0.84	0.78	0.81	0.93	0.87	0.78
Adj. Flow (vph)	118	54	163	182	436	128	173	10	101	1505	252	36
RTOR Reduction (vph)	0	0	164	0	0	0	163	0	0	0	111	0
Lane Group Flow (vph)	0	172	181	0	436	128	20	0	101	1505	177	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	Prot	NA		Prot	NA	Perm		Prot	NA	Perm	
Protected Phases	7	7	4		3	8			5	2		
Permitted Phases							8				2	
Actuated Green, G (s)	12.0	8.7		13.0	9.7	9.7		13.5	31.1	31.1		
Effective Green, g (s)	12.0	8.7		13.0	9.7	9.7		13.5	31.1	31.1		
Actuated g/C Ratio	0.13	0.10		0.14	0.11	0.11		0.15	0.34	0.34		
Clearance Time (s)	5.0	7.0		5.0	7.0	7.0		5.0	6.0	6.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0		
Lane Grp Cap (vph)	233	311		490	198	168		508	1736	540		
v/s Ratio Prot	0.10	0.06		c0.13	c0.07			0.03	c0.30			
v/s Ratio Perm						0.01					0.11	
v/c Ratio	0.74	0.58		0.89	0.65	0.12		0.20	0.87	0.33		
Uniform Delay, d1	37.6	39.0		37.9	38.6	36.4		33.6	27.6	21.8		
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		
Incremental Delay, d2	11.5	2.7		17.7	7.1	0.3		0.2	6.1	1.6		
Delay (s)	49.1	41.8		55.6	45.7	36.7		33.8	33.7	23.4		
Level of Service	D	D		E	D	D		C	C	C		
Approach Delay (s)		44.2			49.2				32.2			
Approach LOS		D			D				C			
<b>Intersection Summary</b>												
HCM 2000 Control Delay		36.6			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.87										
Actuated Cycle Length (s)		90.2			Sum of lost time (s)			23.0				
Intersection Capacity Utilization		77.7%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												



Movement	SBL2	SBL	SBT	SBR	SWR2
Lane Configurations					
Traffic Volume (vph)	142	209	1285	62	137
Future Volume (vph)	142	209	1285	62	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	0.91	1.00	
Fr <sub>t</sub>	1.00	1.00	0.99	0.86	
Flt Protected	0.95	0.95	1.00	1.00	
Satd. Flow (prot)	1752	1752	4996	1596	
Flt Permitted	0.95	0.95	1.00	1.00	
Satd. Flow (perm)	1752	1752	4996	1596	
Peak-hour factor, PHF	0.84	0.87	0.93	0.79	0.84
Adj. Flow (vph)	169	240	1382	78	163
RTOR Reduction (vph)	0	0	6	0	105
Lane Group Flow (vph)	169	240	1454	0	58
Heavy Vehicles (%)	3%	3%	3%	3%	3%
Turn Type	Prot	Prot	NA		Perm
Protected Phases	1	1	6		
Permitted Phases				6	
Actuated Green, G (s)	14.4	14.4	32.0	32.0	
Effective Green, g (s)	14.4	14.4	32.0	32.0	
Actuated g/C Ratio	0.16	0.16	0.35	0.35	
Clearance Time (s)	5.0	5.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	279	279	1772	566	
v/s Ratio Prot	0.10	0.14	c0.29		
v/s Ratio Perm				0.04	
v/c Ratio	0.61	0.86	0.82	0.10	
Uniform Delay, d1	35.3	36.9	26.5	19.5	
Progression Factor	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.7	22.7	4.4	0.4	
Delay (s)	38.9	59.6	30.9	19.8	
Level of Service	D	E	C	B	
Approach Delay (s)			35.3		
Approach LOS			D		
<b>Intersection Summary</b>					

	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	58	36	111	140	403	111	59	4	98	590	125	23
Future Volume (vph)	58	36	111	140	403	111	59	4	98	590	125	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)					0		220		0		220	
Storage Lanes					1		0		2		2	
Taper Length (ft)					25		25		25		25	
Lane Util. Factor	0.95	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.97	0.91	1.00	0.91
Fr <sub>t</sub>					0.917			0.850				0.850
Flt Protected					0.950			0.950				0.950
Satd. Flow (prot)	0	1687	3094	0	3273	1776	1509	0	3273	4848	1509	0
Flt Permitted					0.950			0.950				0.950
Satd. Flow (perm)	0	1687	3094	0	3273	1776	1509	0	3273	4848	1509	0
Right Turn on Red					Yes			Yes				Yes
Satd. Flow (RTOR)					167			173				127
Link Speed (mph)					35			35				45
Link Distance (ft)					480			1479				649
Travel Time (s)					9.4			28.8				9.8
Peak Hour Factor	0.78	0.78	0.83	0.84	0.90	0.83	0.79	0.78	0.82	0.92	0.84	0.78
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Adj. Flow (vph)	74	46	134	167	448	134	75	5	120	641	149	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	120	301	0	448	134	80	0	120	641	178	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Left	Right	Left	Left	Right	Right	Left	Left	Right	Right
Median Width(ft)					24			24				24
Link Offset(ft)					0			0				0
Crosswalk Width(ft)					16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	15		9	15		9	9	15		9	9
Number of Detectors	1	1	1		1	1	1		1	1	1	
Detector Template	Left	Left	Thru		Left	Thru	Right		Left	Thru	Right	
Leading Detector (ft)	20	40	40		40	40	40		40	40	40	
Trailing Detector (ft)	0	0	0		0	0	0		0	0	0	
Detector 1 Position(ft)	0	0	0		0	0	0		0	0	0	
Detector 1 Size(ft)	20	40	40		40	40	40		40	40	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	
Turn Type	Prot	Prot	NA		Prot	NA	Perm		Prot	NA	Perm	
Protected Phases	7	7	4		3	8			5	2		
Permitted Phases								8				2
Detector Phase	7	7	4		3	8	8		5	2	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	8.0		5.0	8.0	8.0		5.0	15.0	15.0	
Minimum Split (s)	10.0	10.0	16.0		10.0	16.0	16.0		23.0	34.0	34.0	



Lane Group	SBL2	SBL	SBT	SBR	SWR2
Lane Configurations	↑	↑	↑↑↑	↑	↑
Traffic Volume (vph)	52	209	1995	78	47
Future Volume (vph)	52	209	1995	78	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Storage Length (ft)		220		0	
Storage Lanes		2		0	
Taper Length (ft)		25			
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00
Fr <sub>t</sub>			0.993		0.865
Flt Protected	0.950	0.950			
Satd. Flow (prot)	1687	1687	4814	0	1536
Flt Permitted	0.950	0.950			
Satd. Flow (perm)	1687	1687	4814	0	1536
Right Turn on Red			Yes		Yes
Satd. Flow (RTOR)			8		289
Link Speed (mph)			45		
Link Distance (ft)			1000		
Travel Time (s)			15.2		
Peak Hour Factor	0.78	0.87	0.95	0.80	0.78
Heavy Vehicles (%)	7%	7%	7%	7%	7%
Adj. Flow (vph)	67	240	2100	98	60
Shared Lane Traffic (%)					
Lane Group Flow (vph)	67	240	2198	0	60
Enter Blocked Intersection	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Right
Median Width(ft)			24		
Link Offset(ft)			0		
Crosswalk Width(ft)			16		
Two way Left Turn Lane					
Headway Factor	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	15		9	9
Number of Detectors	1	1	1		1
Detector Template	Left	Left	Thru		Right
Leading Detector (ft)	40	40	40		20
Trailing Detector (ft)	0	0	0		0
Detector 1 Position(ft)	0	0	0		0
Detector 1 Size(ft)	40	40	40		20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel					
Detector 1 Extend (s)	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0
Turn Type	Prot	Prot	NA		Perm
Protected Phases	1	1	6		
Permitted Phases					6
Detector Phase	1	1	6		6
Switch Phase					
Minimum Initial (s)	5.0	5.0	15.0		15.0
Minimum Split (s)	12.0	12.0	21.0		21.0



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Total Split (s)	17.0	17.0	16.0		21.0	20.0	20.0		23.0	51.0	51.0	
Total Split (%)	14.2%	14.2%	13.3%		17.5%	16.7%	16.7%		19.2%	42.5%	42.5%	
Maximum Green (s)	12.0	12.0	9.0		16.0	13.0	13.0		18.0	45.0	45.0	
Yellow Time (s)	3.0	3.0	4.0		3.0	4.0	4.0		3.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	3.0		2.0	3.0	3.0		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	
Total Lost Time (s)	5.0	7.0			5.0	7.0	7.0		5.0	6.0	6.0	
Lead/Lag	Lead	Lead	Lag		Lead	Lag	Lag		Lag	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Recall Mode	None	None	None		None	None	None		None	Max	Max	
Act Effect Green (s)	11.2	8.8			16.0	13.6	13.6		12.2	45.6	45.6	
Actuated g/C Ratio	0.10	0.08			0.14	0.12	0.12		0.11	0.40	0.40	
v/c Ratio	0.73	0.77			0.98	0.64	0.24		0.34	0.33	0.26	
Control Delay	75.5	37.0			86.2	63.8	1.7		49.4	25.0	9.2	
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0	0.0	0.0	
Total Delay	75.5	37.0			86.2	63.8	1.7		49.4	25.0	9.2	
LOS	E	D			F	E	A		D	C	A	
Approach Delay					48.0		71.5			25.1		
Approach LOS					D		E			C		

#### Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 114.2

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 43.7

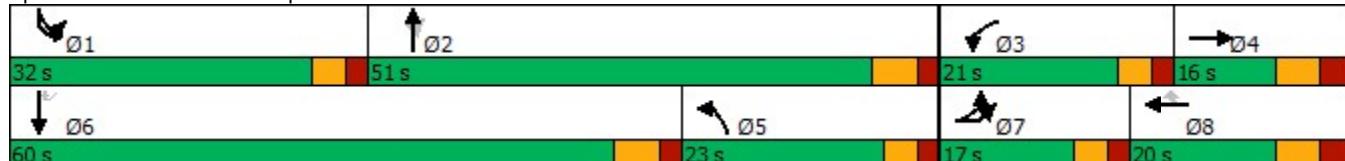
Intersection LOS: D

Intersection Capacity Utilization 82.7%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Vasquez Blvd & 60th Ave





Lane Group	SBL2	SBL	SBT	SBR	SWR2
Total Split (s)	32.0	32.0	60.0		60.0
Total Split (%)	26.7%	26.7%	50.0%		50.0%
Maximum Green (s)	27.0	27.0	54.0		54.0
Yellow Time (s)	3.0	3.0	4.0		4.0
All-Red Time (s)	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.0	5.0	6.0		6.0
Lead/Lag	Lead	Lead	Lead		Lead
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0	3.0		3.0
Recall Mode	None	None	Max		Max
Act Effect Green (s)	20.8	20.8	54.1		54.1
Actuated g/C Ratio	0.18	0.18	0.47		0.47
v/c Ratio	0.22	0.78	0.96		0.07
Control Delay	40.8	62.4	41.6		0.1
Queue Delay	0.0	0.0	0.0		0.0
Total Delay	40.8	62.4	41.6		0.1
LOS	D	E	D		A
Approach Delay			43.6		
Approach LOS			D		

Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBL	SBT	SWR2
Lane Group Flow (vph)	120	301	448	134	80	120	641	178	67	240	2198	60
v/c Ratio	0.73	0.77	0.98	0.64	0.24	0.34	0.33	0.26	0.22	0.78	0.96	0.07
Control Delay	75.5	37.0	86.2	63.8	1.7	49.4	25.0	9.2	40.8	62.4	41.6	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	0.0
Total Delay	75.5	37.0	86.2	63.8	1.7	49.4	25.0	9.2	40.8	62.4	41.6	0.1
Queue Length 50th (ft)	86	51	171	96	0	42	119	23	42	169	556	0
Queue Length 95th (ft)	#137	88	#296	#164	0	65	163	64	71	249	#752	0
Internal Link Dist (ft)		400		1399			569				920	
Turn Bay Length (ft)			220			220		220	220	220		150
Base Capacity (vph)	177	398	459	211	331	516	1933	678	399	399	2284	879
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	0.68	0.76	0.98	0.64	0.24	0.23	0.33	0.26	0.17	0.60	0.96	0.07

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	58	36	111	140	403	111	59	4	98	590	125	23
Future Volume (vph)	58	36	111	140	403	111	59	4	98	590	125	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	7.0		5.0	7.0	7.0		5.0	6.0	6.0		
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00		0.97	0.91	1.00		
Frt	1.00	0.92		1.00	1.00	0.85		1.00	1.00	0.85		
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.95	1.00	1.00		
Satd. Flow (prot)	1687	3093		3273	1776	1509		3273	4848	1509		
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.95	1.00	1.00		
Satd. Flow (perm)	1687	3093		3273	1776	1509		3273	4848	1509		
Peak-hour factor, PHF	0.78	0.78	0.83	0.84	0.90	0.83	0.79	0.78	0.82	0.92	0.84	0.78
Adj. Flow (vph)	74	46	134	167	448	134	75	5	120	641	149	29
RTOR Reduction (vph)	0	0	154	0	0	0	70	0	0	0	76	0
Lane Group Flow (vph)	0	120	147	0	448	134	10	0	120	641	102	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Prot	Prot	NA		Prot	NA	Perm		Prot	NA	Perm	
Protected Phases	7	7	4		3	8			5	2		
Permitted Phases							8				2	
Actuated Green, G (s)	11.2	8.8		16.0	13.6	13.6		12.2	45.5	45.5		
Effective Green, g (s)	11.2	8.8		16.0	13.6	13.6		12.2	45.5	45.5		
Actuated g/C Ratio	0.10	0.08		0.14	0.12	0.12		0.11	0.40	0.40		
Clearance Time (s)	5.0	7.0		5.0	7.0	7.0		5.0	6.0	6.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0		
Lane Grp Cap (vph)	165	238		458	211	179		349	1933	601		
v/s Ratio Prot	0.07	0.05		c0.14	c0.08			0.04	c0.13			
v/s Ratio Perm						0.01				0.07		
v/c Ratio	0.73	0.62		0.98	0.64	0.05		0.34	0.33	0.17		
Uniform Delay, d1	50.0	51.0		48.9	47.9	44.5		47.2	23.8	22.1		
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		
Incremental Delay, d2	14.8	4.7		36.0	6.1	0.1		0.6	0.5	0.6		
Delay (s)	64.7	55.7		84.8	54.0	44.7		47.8	24.2	22.7		
Level of Service	E	E		F	D	D		D	C	C		
Approach Delay (s)			58.3		73.7				27.0			
Approach LOS			E		E				C			
<b>Intersection Summary</b>												
HCM 2000 Control Delay		44.7									D	
HCM 2000 Volume to Capacity ratio		0.86										
Actuated Cycle Length (s)		114.1									23.0	
Intersection Capacity Utilization		82.7%									E	
Analysis Period (min)		15										
c Critical Lane Group												

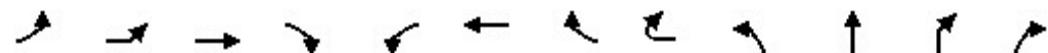


Movement	SBL2	SBL	SBT	SBR	SWR2
Lane Configurations	1	1	1, 1, 1	1	1
Traffic Volume (vph)	52	209	1995	78	47
Future Volume (vph)	52	209	1995	78	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	0.91	1.00	
Fr <sub>t</sub>	1.00	1.00	0.99	0.86	
Flt Protected	0.95	0.95	1.00	1.00	
Satd. Flow (prot)	1687	1687	4815	1536	
Flt Permitted	0.95	0.95	1.00	1.00	
Satd. Flow (perm)	1687	1687	4815	1536	
Peak-hour factor, PHF	0.78	0.87	0.95	0.80	0.78
Adj. Flow (vph)	67	240	2100	98	60
RTOR Reduction (vph)	0	0	4	0	32
Lane Group Flow (vph)	67	240	2194	0	28
Heavy Vehicles (%)	7%	7%	7%	7%	7%
Turn Type	Prot	Prot	NA	Perm	
Protected Phases	1	1	6		
Permitted Phases			6		
Actuated Green, G (s)	20.8	20.8	54.1	54.1	
Effective Green, g (s)	20.8	20.8	54.1	54.1	
Actuated g/C Ratio	0.18	0.18	0.47	0.47	
Clearance Time (s)	5.0	5.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	307	307	2283	728	
v/s Ratio Prot	0.04	0.14	c0.46		
v/s Ratio Perm			0.02		
v/c Ratio	0.22	0.78	0.96	0.04	
Uniform Delay, d1	39.7	44.5	29.0	16.1	
Progression Factor	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	12.2	11.7	0.1	
Delay (s)	40.1	56.7	40.6	16.2	
Level of Service	D	E	D	B	
Approach Delay (s)			42.2		
Approach LOS			D		
<b>Intersection Summary</b>					

Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	111	45	142	171	392	107	145	8	86	1400	219	28
Future Volume (vph)	111	45	142	171	392	107	145	8	86	1400	219	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		100	220		0		220		220	
Storage Lanes		1		0	2		1		2		1	
Taper Length (ft)		25			25				25			
Lane Util. Factor	0.95	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.97	0.91	1.00	0.91
Fr <sub>t</sub>				0.919			0.850				0.850	
Flt Protected		0.950			0.950				0.950			
Satd. Flow (prot)	0	1752	3221	0	3400	1845	1568	0	3400	5036	1568	0
Flt Permitted		0.950			0.950				0.950			
Satd. Flow (perm)	0	1752	3221	0	3400	1845	1568	0	3400	5036	1568	0
Right Turn on Red				Yes				Yes				Yes
Satd. Flow (RTOR)		201				230				170		
Link Speed (mph)		35			35				45			
Link Distance (ft)		480			1479				649			
Travel Time (s)		9.4			28.8				9.8			
Peak Hour Factor	0.83	0.78	0.84	0.85	0.90	0.83	0.84	0.78	0.81	0.93	0.87	0.78
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	134	58	169	201	436	129	173	10	106	1505	252	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	192	370	0	436	129	183	0	106	1505	288	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Left	Right	Left	Left	Right	Right	Left	Left	Right	Right
Median Width(ft)		24			24				24			
Link Offset(ft)		0			0				0			
Crosswalk Width(ft)		16			16				16			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	15		9	15		9	9	15		9	9
Number of Detectors	1	1	1		1	1	1		1	1	1	
Detector Template	Left	Left	Thru		Left	Thru	Right		Left	Thru	Right	
Leading Detector (ft)	20	40	40		40	40	40		40	40	40	
Trailing Detector (ft)	0	0	0		0	0	0		0	0	0	
Detector 1 Position(ft)	0	0	0		0	0	0		0	0	0	
Detector 1 Size(ft)	20	40	40		40	40	40		40	40	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	
Turn Type	Prot	Prot	NA		Prot	NA	Perm		Prot	NA	Perm	
Protected Phases	7	7	4		3	8			5	2		
Permitted Phases						8				2		
Detector Phase	7	7	4		3	8	8		5	2	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	8.0		5.0	8.0	8.0		5.0	15.0	15.0	
Minimum Split (s)	10.0	10.0	16.0		10.0	16.0	16.0		23.0	34.0	34.0	



Lane Group	SBL2	SBL	SBT	SBR	SWR2
Lane Configurations	↑	↑	↑↑↑	↑	↑
Traffic Volume (vph)	142	209	1285	66	137
Future Volume (vph)	142	209	1285	66	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Storage Length (ft)		220		0	
Storage Lanes		2		0	
Taper Length (ft)		25			
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00
Fr <sub>t</sub>			0.991		0.865
Flt Protected	0.950	0.950			
Satd. Flow (prot)	1752	1752	4991	0	1596
Flt Permitted	0.950	0.950			
Satd. Flow (perm)	1752	1752	4991	0	1596
Right Turn on Red			Yes	Yes	
Satd. Flow (RTOR)			11		182
Link Speed (mph)			45		
Link Distance (ft)			1000		
Travel Time (s)			15.2		
Peak Hour Factor	0.84	0.87	0.93	0.79	0.84
Heavy Vehicles (%)	3%	3%	3%	3%	3%
Adj. Flow (vph)	169	240	1382	84	163
Shared Lane Traffic (%)					
Lane Group Flow (vph)	169	240	1466	0	163
Enter Blocked Intersection	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Right
Median Width(ft)			24		
Link Offset(ft)			0		
Crosswalk Width(ft)			16		
Two way Left Turn Lane					
Headway Factor	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	15		9	9
Number of Detectors	1	1	1		1
Detector Template	Left	Left	Thru		Right
Leading Detector (ft)	40	40	40		20
Trailing Detector (ft)	0	0	0		0
Detector 1 Position(ft)	0	0	0		0
Detector 1 Size(ft)	40	40	40		20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel					
Detector 1 Extend (s)	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0
Turn Type	Prot	Prot	NA		Perm
Protected Phases	1	1	6		
Permitted Phases					6
Detector Phase	1	1	6		6
Switch Phase					
Minimum Initial (s)	5.0	5.0	15.0		15.0
Minimum Split (s)	12.0	12.0	21.0		21.0



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Total Split (s)	18.0	18.0	16.0		18.0	16.0	16.0		22.0	36.0	36.0	
Total Split (%)	20.0%	20.0%	17.8%		20.0%	17.8%	17.8%		24.4%	40.0%	40.0%	
Maximum Green (s)	13.0	13.0	9.0		13.0	9.0	9.0		17.0	30.0	30.0	
Yellow Time (s)	3.0	3.0	4.0		3.0	4.0	4.0		3.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	3.0		2.0	3.0	3.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.0	7.0	5.0		7.0	7.0	7.0		5.0	6.0	6.0	
Lead/Lag	Lead	Lead	Lag		Lead	Lag	Lag		Lag	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Recall Mode	None	None	None		None	None	None		None	Max	Max	
Act Effect Green (s)	12.4	8.8		13.0	9.4	9.4		14.7	30.0	30.0		
Actuated g/C Ratio	0.14	0.10		0.15	0.11	0.11		0.16	0.34	0.34		
v/c Ratio	0.79	0.74		0.88	0.66	0.49		0.19	0.89	0.45		
Control Delay	61.2	27.8		58.3	56.9	7.3		31.9	36.2	12.1		
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0		
Total Delay	61.2	27.8		58.3	56.9	7.3		31.9	36.2	12.1		
LOS	E	C		E	E	A		C	D	B		
Approach Delay		39.2			45.6				32.3			
Approach LOS		D			D				C			

#### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 89.2

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 35.9

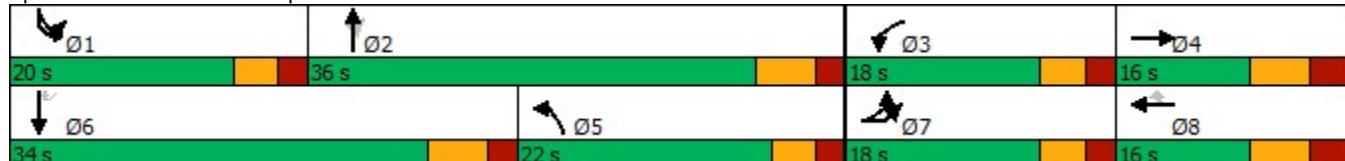
Intersection LOS: D

Intersection Capacity Utilization 78.4%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Vasquez Blvd & 60th Ave





Lane Group	SBL2	SBL	SBT	SBR	SWR2
Total Split (s)	20.0	20.0	34.0		34.0
Total Split (%)	22.2%	22.2%	37.8%		37.8%
Maximum Green (s)	15.0	15.0	28.0		28.0
Yellow Time (s)	3.0	3.0	4.0		4.0
All-Red Time (s)	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.0	5.0	6.0		6.0
Lead/Lag	Lead	Lead	Lead		Lead
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0	3.0		3.0
Recall Mode	None	None	Max		Max
Act Effect Green (s)	14.4	14.4	32.0		32.0
Actuated g/C Ratio	0.16	0.16	0.36		0.36
v/c Ratio	0.60	0.85	0.82		0.24
Control Delay	44.4	63.8	32.4		3.8
Queue Delay	0.0	0.0	0.0		0.0
Total Delay	44.4	63.8	32.4		3.8
LOS	D	E	C		A
Approach Delay			37.5		
Approach LOS			D		

Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBL	SBT	SWR2
Lane Group Flow (vph)	192	370	436	129	183	106	1505	288	169	240	1466	163
v/c Ratio	0.79	0.74	0.88	0.66	0.49	0.19	0.89	0.45	0.60	0.85	0.82	0.24
Control Delay	61.2	27.8	58.3	56.9	7.3	31.9	36.2	12.1	44.4	63.8	32.4	3.8
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	61.2	27.8	58.3	56.9	7.3	31.9	36.2	12.1	44.4	63.8	32.4	3.8
Queue Length 50th (ft)	106	48	127	72	0	26	294	48	90	133	293	0
Queue Length 95th (ft)	#162	84	#210	#135	22	43	#384	109	143	#243	#392	27
Internal Link Dist (ft)		400		1399				569				920
Turn Bay Length (ft)			220			220			220	220	220	150
Base Capacity (vph)	255	506	495	195	371	648	1693	640	295	295	1795	688
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	0.75	0.73	0.88	0.66	0.49	0.16	0.89	0.45	0.57	0.81	0.82	0.24

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	111	45	142	171	392	107	145	8	86	1400	219	28
Future Volume (vph)	111	45	142	171	392	107	145	8	86	1400	219	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	7.0		5.0	7.0	7.0		5.0	6.0	6.0		
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00		0.97	0.91	1.00		
Frt	1.00	0.92		1.00	1.00	0.85		1.00	1.00	0.85		
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.95	1.00	1.00		
Satd. Flow (prot)	1752	3219		3400	1845	1568		3400	5036	1568		
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.95	1.00	1.00		
Satd. Flow (perm)	1752	3219		3400	1845	1568		3400	5036	1568		
Peak-hour factor, PHF	0.83	0.78	0.84	0.85	0.90	0.83	0.84	0.78	0.81	0.93	0.87	0.78
Adj. Flow (vph)	134	58	169	201	436	129	173	10	106	1505	252	36
RTOR Reduction (vph)	0	0	181	0	0	0	164	0	0	0	111	0
Lane Group Flow (vph)	0	192	189	0	436	129	19	0	106	1505	177	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	Prot	NA		Prot	NA	Perm		Prot	NA	Perm	
Protected Phases	7	7	4		3	8			5	2		
Permitted Phases							8				2	
Actuated Green, G (s)	12.4	8.8		13.0	9.4	9.4		13.5	31.1	31.1		
Effective Green, g (s)	12.4	8.8		13.0	9.4	9.4		13.5	31.1	31.1		
Actuated g/C Ratio	0.14	0.10		0.14	0.10	0.10		0.15	0.34	0.34		
Clearance Time (s)	5.0	7.0		5.0	7.0	7.0		5.0	6.0	6.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0		
Lane Grp Cap (vph)	240	313		489	192	163		508	1734	540		
v/s Ratio Prot	0.11	0.06		c0.13	c0.07			0.03	c0.30			
v/s Ratio Perm						0.01				0.11		
v/c Ratio	0.80	0.60		0.89	0.67	0.12		0.21	0.87	0.33		
Uniform Delay, d1	37.7	39.1		38.0	39.0	36.7		33.7	27.7	21.9		
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		
Incremental Delay, d2	17.1	3.3		18.2	8.9	0.3		0.2	6.2	1.6		
Delay (s)	54.9	42.3		56.1	47.9	37.0		33.9	33.9	23.5		
Level of Service	D	D		E	D	D		C	C	C		
Approach Delay (s)			46.6			50.0			32.3			
Approach LOS			D			D			C			
<b>Intersection Summary</b>												
HCM 2000 Control Delay		37.1								D		
HCM 2000 Volume to Capacity ratio		0.87										
Actuated Cycle Length (s)		90.3								23.0		
Intersection Capacity Utilization		78.4%								D		
Analysis Period (min)		15										
c Critical Lane Group												



Movement	SBL2	SBL	SBT	SBR	SWR2
Lane Configurations	1	1	2	1	1
Traffic Volume (vph)	142	209	1285	66	137
Future Volume (vph)	142	209	1285	66	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	0.91	1.00	
Fr <sub>t</sub>	1.00	1.00	0.99	0.86	
Flt Protected	0.95	0.95	1.00	1.00	
Satd. Flow (prot)	1752	1752	4993	1596	
Flt Permitted	0.95	0.95	1.00	1.00	
Satd. Flow (perm)	1752	1752	4993	1596	
Peak-hour factor, PHF	0.84	0.87	0.93	0.79	0.84
Adj. Flow (vph)	169	240	1382	84	163
RTOR Reduction (vph)	0	0	7	0	105
Lane Group Flow (vph)	169	240	1459	0	58
Heavy Vehicles (%)	3%	3%	3%	3%	3%
Turn Type	Prot	Prot	NA		Perm
Protected Phases	1	1	6		
Permitted Phases					6
Actuated Green, G (s)	14.4	14.4	32.0	32.0	
Effective Green, g (s)	14.4	14.4	32.0	32.0	
Actuated g/C Ratio	0.16	0.16	0.35	0.35	
Clearance Time (s)	5.0	5.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	279	279	1769	565	
v/s Ratio Prot	0.10	0.14	c0.29		
v/s Ratio Perm				0.04	
v/c Ratio	0.61	0.86	0.82	0.10	
Uniform Delay, d1	35.3	37.0	26.6	19.5	
Progression Factor	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.7	22.7	4.5	0.4	
Delay (s)	39.0	59.6	31.1	19.9	
Level of Service	D	E	C	B	
Approach Delay (s)			35.5		
Approach LOS			D		
<b>Intersection Summary</b>					



March 8, 2023

Mr. Shawn Poe, City Engineer  
City of Commerce City  
8602 Rosemary Street  
Commerce City, CO 80022



**Re: Drainage Variance Application for 4150 E 60<sup>th</sup> Avenue Floodplain Area (Waste Connections US) in Commerce City, CO  
City Criteria: No Trash or Recycle Facilities in the 100 year floodplain**

Dear Mr. Poe,

The purpose of this letter is to request a drainage variance for the uses allowed in the revised floodplain area. *Commerce City Construction Standards and Specifications*, requires that no trash or recycling activities are allowed in the 100 year floodplain. We understand from the Public Works department staff that a drainage variance application has now been requested to further document the situation that has been proposed with all previous submittals of the project. It is understood that submittal of a Drainage Variance Application is a recent requirement.

Please find attached a drainage variance exhibit. This exhibit shows the site plan for the project superimposed on the limits of the 100 year floodplain and floodway of Sand Creek. It should be noted that much of this site is contained in the 100 year floodplain today and has been used for office and industrial uses in the past. Several of the existing buildings will be removed and a new materials handling facility (MRF) building will be constructed as shown on the attached drawing. The two buildings along 60<sup>th</sup> Ave will remain in their current condition in the floodplain for future uses to be defined later. The uses for these existing buildings will be the subject of future submittals meeting all City criteria when proposed.

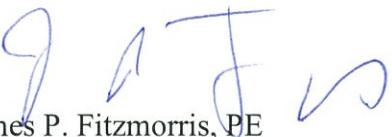
The new MRF building is proposed to be elevated above the 100 year base flood elevation of Sand Creek and is proposed outside of the floodway. This proposed situation with the MRF building is documented in the no rise letter and floodplain permit application submitted with this project's case file. The MRF building will fully contain all trash and recycling activities occurring on this site. The recycle trucks will enter the MRF building through drive in doors near the northwest corner of the building (at a location above the 100 year base flood elevation) as shown on the various drawings submitted with this project and the attached exhibit. The recycle materials will be placed by the recycle trucks indoors in the MRF building for processing. Processed materials will be shipped from the property via truck and/ or rail in the future from areas above the 100 year base flood elevation of Sand Creek.

Uses proposed in the 100 year floodplain are limited to existing buildings, vehicle parking, drives, sidewalks, truck scales, detention/ retention ponds, landscaping and a loading dock.

Therefore based on the above, JR Engineering recommends approving this variance for uses proposed in the floodplain.

If you have any questions or comments, please feel free to contact me at  
[jfitzmorris@jrengineering.com](mailto:jfitzmorris@jrengineering.com) or 303-267-6185.

Sincerely,  
JR Engineering, LLC



James P. Fitzmorris, PE

Vice President/ Client Manager

Attachments:

- Drainage Variance Exhibit

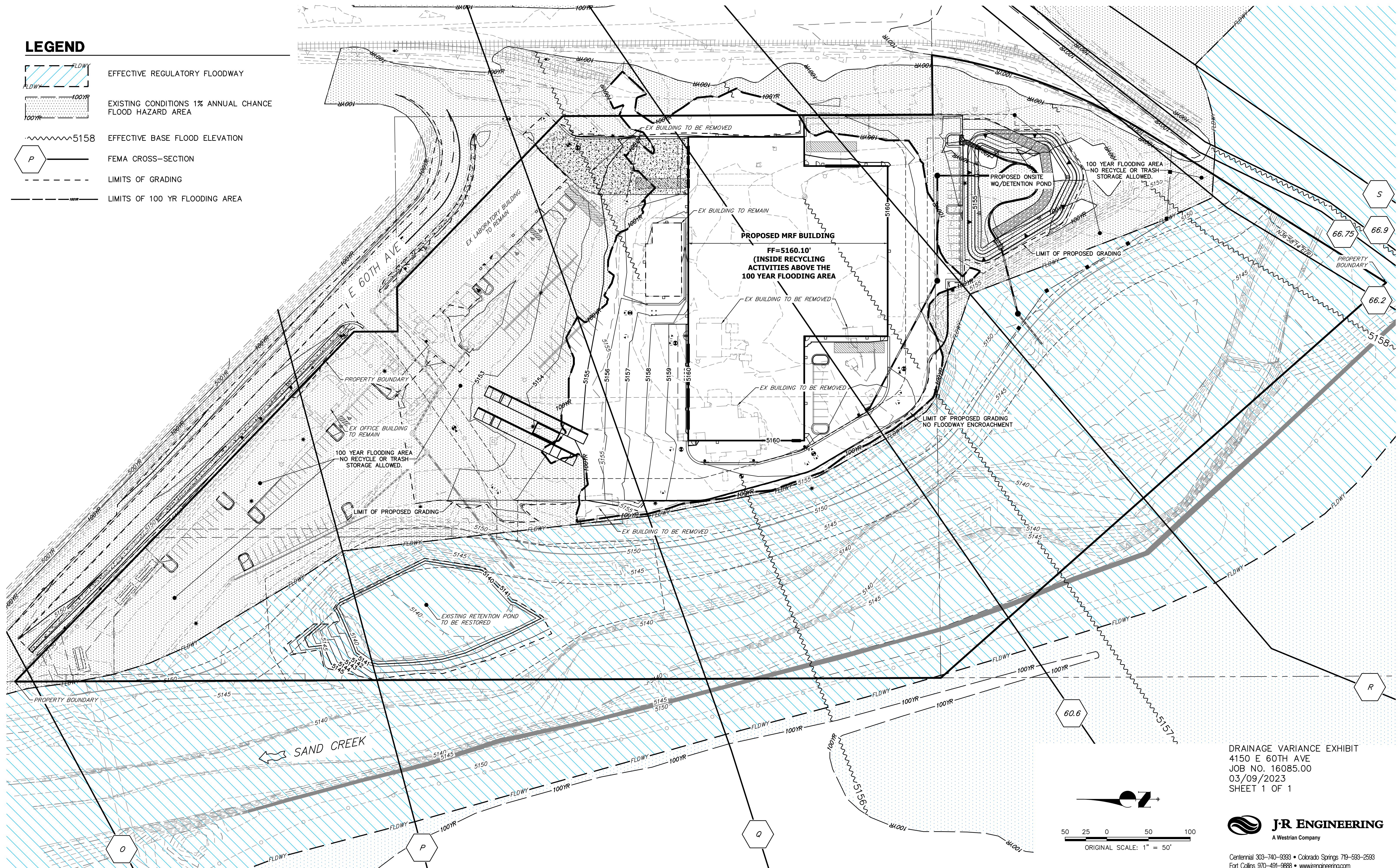
# NO-RISE FLOODPLAIN CERTIFICATION DRAINAGE WORKMAP

**4150 E 60TH AVENUE  
COMMERCE CITY, COLORADO 80022**

# LEGEND

Diagram illustrating floodplain zoning symbols and their meanings:

- EFFECTIVE REGULATORY FLOODWAY:** Represented by a blue line with diagonal hatching. Labels: "FLDWY" at the top and bottom.
- EXISTING CONDITIONS 1% ANNUAL CHANCE FLOOD HAZARD AREA:** Represented by a dotted area. Labels: "100YR" on the left and top.
- EFFECTIVE BASE FLOOD ELEVATION:** Represented by a wavy line. Label: "5158".
- FEMA CROSS-SECTION:** Represented by a hexagon containing the letter "P".
- LIMITS OF GRADING:** Represented by a dashed line.
- LIMITS OF 100 YR FLOODING AREA:** Represented by a solid line. Label: "100YR".



DRAINAGE VARIANCE EXHIBIT  
4150 E 60TH AVE  
JOB NO. 16085.00  
03/09/2023  
SHEET 1 OF 1

50      25      0      50      100

ORIGINAL SCALE: 1" = 50'

**To:** Libby Tart, Planner

**From:** Traci Ferguson, Parks Planner

**Subject:** CU-130-22, S-817-22 4150 E. 60th Ave. Waste Connections

**Date:** April 6, 2023

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The following comments are from January 2023 and have been addressed. Parks does not have any additional comments.

- 1.) A park fee-in-lieu will not be charged for this non-residential development.
- 2.) The proposed trail easement is acceptable. Commerce City staff will continue to maintain the trail and trail edges. Per the conditional use permit, Waste Connections will address any escaped debris on or around the trail.
- 3.) Per the landscape plan (sheet 18 of the development plan), four trees will be planted outside the fence adjacent to the Sand Creek Trail. Waste Connections must supply adequate water to these trees to ensure they survive. The city does not have irrigation in this area and staff will not provide water for the trees.

Please feel free to contact me at 303-227-8788 or [tferguson@c3gov.com](mailto:tferguson@c3gov.com) with any questions.



March 24, 2022

Anita Riley  
City of Commerce City  
Community Development Department  
7887 East 60<sup>th</sup> Avenue  
Commerce City, CO 80022

RE: Waste Connections, CU-130-22 S-817-22  
TCHD Case No. 7527

Dear Ms. Riley,

Thank you for the opportunity to review and comment on the conditional use permit application for a materials recovery facility located at 4150 E 60<sup>th</sup> Avenue. Tri-County Health Department (TCHD) staff has reviewed the application for compliance with applicable environmental and public health regulations and principles of healthy community design. After reviewing the application, TCHD has the following comments.

### **Recycling Facility**

Recycling of materials has the potential to cause odors, ground water contamination, and nuisance conditions. The Hazardous Materials and Waste Management Division of Colorado Department of Public Health and Environment (CDPHE) regulates recycling facilities. This facility must meet the requirements of Section 8 of 6CCR 1007-2, Part 1. More information can be found at <https://www.colorado.gov/pacific/cdphe/recycling>.

### **Historic Landfill**

According to TCHD's records, there are historic landfills located within 1,000 feet of the subject property referenced as Landfill Nos. AD-055, AD-153, and AD-053. Flammable gas from decomposing organic matter in landfills may travel up to 1,000 feet from the source. Because construction is planned on this property, we recommend the following:

1. A flammable gas investigation should be conducted to determine if flammable gas (methane) is present in the subsurface soils at the property. The plan for the investigation should be submitted to TCHD for review and approval.
2. TCHD will review the results of the investigation. If the investigation indicates that methane is not present at or above 20% of the lower explosive limit for methane (1% by volume in air) in the soils, no further action is required.
3. In lieu of the investigation, a flammable gas control system shall be designed and constructed to protect buildings and subsurface access to utilities, i.e. vaults, manholes, etc. from flammable gas. Health and safety practices shall be followed

during construction to protect site workers. A copy of TCHD guidelines for safe construction in areas on or near former landfills has been attached.

Landfill AD-055 is located on the subject site. TCHD recommends that the applicant conduct a Phase II Environmental Site Assessment (Phase II ESA) to determine if buried waste is present on the site. If the Phase II ESA determines waste is present, the applicant will need to develop a plan to address the waste.

The Colorado Department of Public Health and Environment (CDPHE) provides two alternatives to address waste on sites where re-development is proposed:

1. Prepare a Materials Management Plan (MMP) and submit it to the CDPHE Hazardous Materials and Solid Waste Division for review and approval. The applicant may contact Andrew Todd at CDPHE regarding the MMP. Mr. Todd can be reached at: 303-691-4049 or via email: [Andrew.Todd@state.co.us](mailto:Andrew.Todd@state.co.us)
2. Prepare a Voluntary Cleanup Plan (VCUP) for review and approval. The applicant may contact Fonda Apostolopoulos, at CDPHE regarding the VCUP. Mr. Apostolopoulos can be reached at: 303-692-3411 or via email: [Fonda.Apostolopoulos@state.co.us](mailto:Fonda.Apostolopoulos@state.co.us)

TCHD recommends that the applicant submit Phase II ESA to us for review.

Questions regarding this may be directed to Warren Brown at 720-200-1568 or [wbrown@tchd.org](mailto:wbrown@tchd.org).

### **On-Site Wastewater Treatment System (OWTS) – Abandonment**

Proper wastewater management promotes effective and responsible water use, protects potable water from contaminants, and provides appropriate collection, treatment, and disposal of waste, which protects public health and the environment. Our records indicate the presence of an On-Site Wastewater Treatment System (OWTS) on the subject property. The existing OWTS shall be abandoned in accordance with Regulation No. O-17, Section 6.8. TCHD must be notified in writing once the system has been properly abandoned. For more information, or to submit the notification, the applicant may contact TCHD Commerce City Office, 7190 Colorado Blvd., Commerce City, CO 80022, 303-288-6816. More information is available at <http://www.tchd.org/269/Septic-Systems>.

### **Air Quality - Building Demolition**

The application indicates that the existing buildings on the site will be demolished.

The Colorado Department of Public Health and Environment Air Pollution Control Division (APCD) regulates air emissions. State air quality regulations require that precautions be taken prior to demolition of buildings to evaluate the presence of

asbestos fibers that may present a health risk. If asbestos is present, actions must be taken to prevent their release into the environment. State regulations also address control of ozone depleting compounds (chlorofluorocarbons) that may be contained in air conditioning or refrigerating equipment. The applicant shall contact the APCD at (303) 692-3100 for more information. Additional information is available at <http://www.cdphe.state.co.us/ap/asbestos>.

Buildings constructed prior to 1978 may contain lead paint. Environmental Protection Agency's (EPA) 2008 Lead-Based Paint Renovation, Repair and Painting (RRP) Rule (as amended in 2010 and 2011), aims to protect the public from lead-based paint hazards associated with renovation, repair and painting activities. These activities can create hazardous lead dust when surfaces with lead paint, even from many decades ago, are disturbed. More information can be found here <https://www.epa.gov/lead/lead-renovation-repair-and-painting-program-rules> and <https://www.epa.gov/lead>. The applicant may contact, and the Environmental Protection Agency EPA at 1-800-424-5323 for more information.

### **Vector Control – Building Demolition**

Rodents such as mice and rats carry diseases which can be spread to humans through contact with rodents, rodent feces, urine, saliva, or through rodent bites. For example, Hantavirus Pulmonary Syndrome (HPS), a rare but potentially lethal viral infection, can be found in the droppings and urine of rodents commonly found in southwestern United States. When buildings are demolished, rodents can spread to surrounding properties and increase the risk of vector exposure to humans. The applicant should plan for vectors and eliminate any known infestations prior to demolition. Information on rodent control can be found at <http://www.tchd.org/400/Rodent-Control>.

### **Mosquito Control - Stormwater Facilities**

The site plan indicates that a detention pond is proposed. Detention ponds can become sites for mosquito breeding. To reduce the potential for human exposures to West Nile and other mosquito-borne viruses, TCHD recommends that the applicant prepare a mosquito control plan. Elements of the plan should include proper design, construction and regular inspection and maintenance of stormwater quality facilities, and mosquito larvaciding if the insects become a problem. The applicant may submit the mosquito control plan to TCHD for review. More information is available here <http://www.tchd.org/276/Mosquitoes-West-Nile-Virus>. A guidance document is attached.

### **Vector Control - Storage**

Rodents such as mice and rats carry diseases which can be spread to humans through contact with rodents, rodent feces, urine, or saliva, or through rodent bites. Items on the site will provide potential harborage for rodents. Due to the variety of items to be potentially stored at this site, TCHD recommends that the applicant create a plan for regular pest control. Information on rodent control can be found at <http://www.tchd.org/400/Rodent-Control>

Waste Connections  
March 24, 2022  
Page 4 of 7

Please feel free to contact me at 720-200-1575 or [kboyer@tchd.org](mailto:kboyer@tchd.org) if you have any questions about TCHD's comments.

Sincerely,



Kathy Boyer, REHS  
Land Use and Built Environment Specialist III

cc: Sheila Lynch, Keith Homersham, Warren Brown, Gilbert Cazier, TCHD  
Fonda Apostolopoulos, Andrew Todd, CDPHE

Attachments



August 17, 2022

Anita Riley  
City of Commerce City  
Community Development Department  
7887 East 60<sup>th</sup> Avenue  
Commerce City, CO 80022

RE: Waste Connections, CU-130-22 S-817-22, Third Submittal  
TCHD Current Case No. 7815  
TCHD Previous Case Nos. 7699, 7527

Dear Ms. Riley,

Thank you for the opportunity to review and comment on the Third Submittal of conditional use permit application for a materials recovery facility located at 4150 E 60<sup>th</sup> Avenue. In our letter dated June 1, 2022, TCHD provided the following comments regarding Historic Landfills (buried waste) and Air Quality (Building Demolition).

***Historic Landfills***

*TCHD remains concerned about the potential to encounter buried waste during construction. TCHD recommends that the applicant prepare a materials management plan that will be implemented in the event buried waste or other unknowns are encountered during the construction process. The applicant shall submit the plan to TCHD and the CDPHE Solid Waste Division for review and approval. The applicant shall contact Jerry Henderson, with the CDPHE Solid Waste Division at 720-263-0710 or via email at: [jerry.henderson@state.co.us](mailto:jerry.henderson@state.co.us)*

***Air Quality, Building Demolition***

*The applicant will need to submit a "Demolition Notification Application Form" to the Colorado Department of Health and Environment" prior to the demolition.*

Included in the resubmittal packet is a letter from JR Engineering dated July 18, 2022 responding to comments from Commerce City Planning Department and the referral agencies. TCHD notes that the applicant has not responded to our previous comments. TCHD continues to recommend that our comments be addressed.

Waste Connections  
August 17, 2022  
Page 2 of 2

Please feel free to contact me at 720-200-1568 or [wbrown@tchd.org](mailto:wbrown@tchd.org) with any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Warren S. Brown".

Warren S. Brown, P.E.  
Senior Environmental Health Consultant

cc: Keith Homersham, Kathleen Boyer, Jerry Henderson, CDPHE

## **HEALTH AND SAFETY PRACTICES DURING CONSTRUCTION ON OR NEAR FORMER LANDFILLS**

If it has not been demonstrated that flammable gas is not present, the following health and safety practices shall be followed:

1. A flammable gas indicator will be utilized at all times during trenching, excavation, drilling, or when working within ten (10) feet of an open excavation.
2. Before personnel are permitted to enter an open trench or excavation, the trench or excavation will be monitored to ensure that flammable gas is not present in concentrations exceeding 1% and that oxygen is present at a minimum concentration of 19.5%. When in an excavation or trench, each work party will work no more than five (5) feet from a continuous flammable gas and oxygen monitor.
3. When trenching, excavating, or drilling deeper than two (2) feet into the fill, or in the presence of detectable concentrations of flammable gas, the soils will be wetted and the operating equipment will be provided with spark proof exhausts.
4. A dry chemical fire extinguisher, ABC rated, will be provided on all equipment used in the landfill.
5. Personnel within or near an open trench or drill hole will be fully clothed, and wear shoes with non-metallic soles, a hard hat and safety goggles or glasses.
6. Exhaust blowers will be used where trenches show a concentration of 1% flammable gas or a concentration of less than 19.5% oxygen.
7. Smoking will not be permitted in any area within one hundred (100) feet of the excavation.
8. Personnel will be kept upwind of any open trench unless the trench is continuously monitored.
9. All other applicable Safety and Health Regulations for Construction, as promulgated in 29 CFR by the Occupational Safety and Health Administration, shall be met. Applicable regulations include, but may not be limited to, the confined space standard (Part 1926.21(b)(6)( i ) and ( ii ) in Subpart C ); gases, vapors, fumes, dusts and mists (Part 1926.55 in Part 1926 Subpart E); fire protection and prevention (Part 1926 Subpart F); and trenching and excavation (Part 1926 Subpart P).
10. Compliance with the Occupational Safety and Health Administration's confined space requirements for general industry, as promulgated in 29 CFR 1910.146 and Appendices A- F.

**Tri-County Health Department  
Guidance for Preparation of  
Mosquito Control Plan**

A Mosquito Control Plan should contain the following elements:

1. Designation of a management entity

This is the entity with authority/responsibility for implementing the plan. Typically, this will be a Special District or a Homeowners Association. If this is the case, the applicant shall submit a copy of the organizational Service Plan, by-laws or other legal document providing the authority for mosquito control. If the entity is the developer, this should be noted.

2. Funding mechanism

A method needs to be put in place to finance the program. This could be a commitment for the Service District, HOA or developer to include adequate funds for the activities as part of its annual budgeting process, or a plan by the District or HOA to assess an annual fee on residents in the subject service area, or to fund the program in some other way, per its legal authority as noted in #1.

3. Activities that will be undertaken to prevent mosquito breeding conditions

This section places emphasis on the proper design, construction, operation and maintenance of stormwater facilities to prevent mosquitoes from breeding. In most instances, it is nothing different than is already required by the County and Volume 3 of the Urban Drainage and Flood Control District's (UDFCD) Urban Storm Drainage Criteria Manual for flood control and stormwater quality. The literature on this subject, supported by local field experience, suggests that if stormwater facilities are well-designed, built to specification, and regularly inspected and maintained to meet operating standards, stormwater facilities that are designed to completely drain in 72 hours or less are likely to do so and to prevent mosquito breeding conditions.

The likelihood or extent of mosquito breeding can also be reduced through the proper design, construction and inspection/maintenance of retention ponds or constructed wetlands that are intended to hold permanent water pools.

We have found that at the time of construction of stormwater facilities, there is often little thought given to continuity of maintenance. Requiring the applicant to think through the tasks that need to be accomplished from design through operation, who will be responsible for tasks in each phase, and a schedule for their accomplishment increases the probability that these tasks will be completed.

Ideally, before getting to this point, the applicant will have considered stormwater facility options that do not rely on extended retention or detention of stormwater without flushing over a period of 2-3 days; e.g. grass swales, porous pavements, landscape detention, reducing directly connecting impervious areas to increase infiltration. This would be coordinated through and in compliance with the requirements of the County's Engineering and/or Stormwater sections.

Suggested elements in this section include the following:

- Design review – Qualified personnel review construction plans and conduct field investigation to ensure construction per specifications of UDFCD Volume 3 and County criteria.
- Operation and maintenance activities:  
This should identify who will conduct these activities (e.g., staff or contractor), and a schedule or trigger point for doing each task. Again, the UDFCD's Vol. 3 contains minimum operation and maintenance activities. If staff are to be used, this section should note if they will need training and how they will receive it.
- Regular inspections:  
Facilities that are found to retain water should be inspected regularly to ensure that no mosquito larvae are present. Facilities should be inspected once a week beginning in April and continuing through September.
- Larvicide program:  
Even if inspections do not reveal larvae, a larvacing program should be established as a preventive measure at the same time that the inspection program begins (generally May) and continue through September. Some mosquitoes lay their eggs in mud, and when rain falls later, they can hatch and present a problem. Larvicide should be applied at the recommended rate and frequency specified by the product manufacturer. Mosquito control products can be found by doing a search on the internet.  
Natural control of mosquito larva can be very effective if done properly. Consult the Colorado Department of Wildlife, Fisheries Division, for consultation on proper stocking of ponds with fish that will effectively control mosquito larvae.

For technical assistance or if you have any questions about any elements of the mosquito control program, contact Gilbert Cazier, Tri-County Health Department's mosquito control specialist, at [gcazier@tchd.org](mailto:gcazier@tchd.org).



Community & Economic Development Department  
Environmental Programs  
4430 S. Adams County Pkwy.  
1st Floor, Suite W2000B  
Brighton, CO 80601-8218  
PHONE 720.523.6800 | FAX 720.523.6967  
adcgov.org

## MEMORANDUM

April 11, 2023

Libby Tart  
Department of Community Development  
City of Commerce City | 7887 E. 60th Ave.  
etart@c3gov.com

RE: Adams County Built Environment Impact Referral Comments on Commerce City  
Cases S-817-23 and CUP-130-23

Hello Libby,

Thank you for the opportunity to review and comment on the proposed project located at 4150 E 60th Avenue, Commerce City, CO. The applicant, Waste Connections of Colorado, is proposing to plat and redevelop a 16.93-acre parcel for a recycled materials processing center.

Zoning: I-3 (Heavy Intensity Industrial)  
Parcel ID: 0182307300043

Adams County Environmental Programs staff has reviewed the application and provides these comments in support of environmental and public health protection. After reviewing the application, we have the following comments:

1. There are no historical Adams County permits associated with the subject parcel.
2. The subject parcel is transected by the Federal Emergency Management Agency (FEMA) 100 Year Floodplain, 500 Year Floodplain, and 100 Year Floodway. Development of this parcel may be subject to regulations and requirements associated with these designations.
3. The subject parcel is contained by Adams County's Natural Resource Conservation Overlay. These mapped areas in Adams County were identified to protect important wildlife areas, designated floodplains, riparian corridors, and cultural resources. The applicant may want to consider conducting an evaluation of the development area for important wildlife, ecological, and cultural resources prior to site disturbance so that appropriate mitigation measures, if necessary, are implemented.

4. The applicant shall follow all applicable Colorado Department of Public Health and Environment (CDPHE) Solid and Hazardous Waste Commission/Hazardous Materials and Waste Management Division regulations for solid waste sites and facilities (contained in 6 Code of Colorado Regulations 1007-2 Part 1). These regulations are promulgated pursuant to the "Solid Wastes Disposal Sites and Facilities Act", Title 30, Article 20, Part 1, Colorado Revised Statutes (CRS), as amended.
5. The operator will need to register as a recycler with CDPHE within 30 days of commencing operations.
6. Exposure to air pollution is associated with various health problems including asthma, lung cancer, and heart disease. The CDPHE Air Pollution Control Division (APCD) regulates emissions of criteria air pollutants, hazardous air pollutants (i.e., air toxics), opacity, and fugitive dust. For proposed uses and/or operations that may emit air pollutants, the applicant must verify the need for an air permit with APCD. For projects that may require an air permit, the applicant shall contact the APCD at (303) 692-3100 for information about the process. Additional information is available at <https://www.colorado.gov/pacific/cdphe/categories/services-and-information/environment/air-quality/air-emissions-business-and-industry>

The following comments may apply to the conditional use permit and recycling facility:

7. The applicant may need to prepare a Recycling Operations Plan, which should include the following:
  - a. A physical description of the facility and the types of recyclable materials managed,
  - b. A description of amount of material on-site, frequency of recycling activities, and anticipated turnover rate,
  - c. Methods to prevent unauthorized vehicle traffic and illegal dumping by adequate fencing or other security means,
  - d. Procedures for preventing receipt of unauthorized waste materials, and
  - e. A closure plan including a plan for the disposition of collected materials on-site at the time of closure.
8. The applicant may need to prepare a Material Acceptance and Handling Plan, which would indicate how the applicant will prevent non-recyclable material from entering the site, the screening procedures for incoming loads and tipping floor, and the process for handling unacceptable materials.
9. The applicant may need to prepare a Nuisance Control Plan that addresses how nuisance hazard impacts including fugitive dust, noise, lighting, and odor will be controlled.

10. CDPHE currently does not consider shingles or drywall as recyclable waste streams, as there is no end market for them. These items are considered solid waste and should not be accepted as recyclable materials at the facility.

The following comments may apply to traffic, parking, and maintenance:

11. Adams County recommends that truck and equipment repair maintenance be performed on a concrete pad. The applicant may need to prepare a description of truck and equipment repair and maintenance operations, locations on site, and handling of fluids, used oil, and material storage.
12. Adams County recommends that all hydraulic fluids, oils, and other pollutant sources be stored within a covered area and in secondary containment.
13. It is recommended that the applicant implement dust control measures to prevent off-site impacts if heavy truck and equipment traffic on non-paved surfaces will occur.
14. To mitigate off-site noise and air quality impacts to surrounding properties, Adams County recommends that the applicant limit engine idling to the maximum extent feasible.

The following comments may apply at time of design, demolition, and construction:

15. The way that buildings are designed impacts health through the materials used and the amount of volatile organic compounds (VOCs) or other harmful chemicals that they contain; the air and water quality; the amount of daylight; and even by encouraging physical activity and social interaction. Adams County encourages the applicant to consider incorporating design standards to ensure a health-promoting environment. The applicant could pursue building certifications such as LEED, WELL Building Standard, Certified Healthy, or Living Building Challenge.
16. State air quality regulations require that precautions be taken prior to demolition of buildings to evaluate the presence of asbestos fibers that may present a health risk. If asbestos is present, actions must be taken to prevent their release into the environment. State regulations also address control of ozone depleting compounds (e.g., chlorofluorocarbons) that may be contained in air conditioning or refrigerating equipment. The applicant shall contact the Colorado Department of Public Health and Environment Air Pollution Control Division (APCD) at (303) 692-3100 for more information. Additional information is available at <http://www.cdphe.state.co.us/ap/asbestos>.