Traffic Impact Study

Please fill out and submit the TIS checklist to ensure that all applicable report requirements are addressed.

Barbarick Waste Transfer Station

El Paso County, Colorado

Add "PCD File No. AL2310"

Prepared for:

Graham Construction Management

Kimley»Horn

T R A F F I C I M P A C T S T U D Y

Traffic Engineer's Statement

The attached traffic report and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.

Jeffrey R. Planck

September 15, 2022

Jeffrey R. Planck, P.E., PE #53006 — Date

Developer's Statement

I, the Developer, have read and will comply with all commitments made on my behalf within this report.

Provide signature and date

Mr. Richard Graham, Jr. — Date
Graham Construction Management
4615 Northpark Drive
Colorado Springs, CO 80918

Barbarick Waste Transfer Station

El Paso County, Colorado

Prepared for
Graham Construction Management
4615 Northpark Drive
Colorado Springs, CO 80918

Prepared by
Kimley-Horn and Associates, Inc.
2 North Nevada Avenue
Suite 300
Colorado Springs, Colorado 80903
(719) 453-0180

September 2022

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1.0 EXECUTIVE SUMMARY

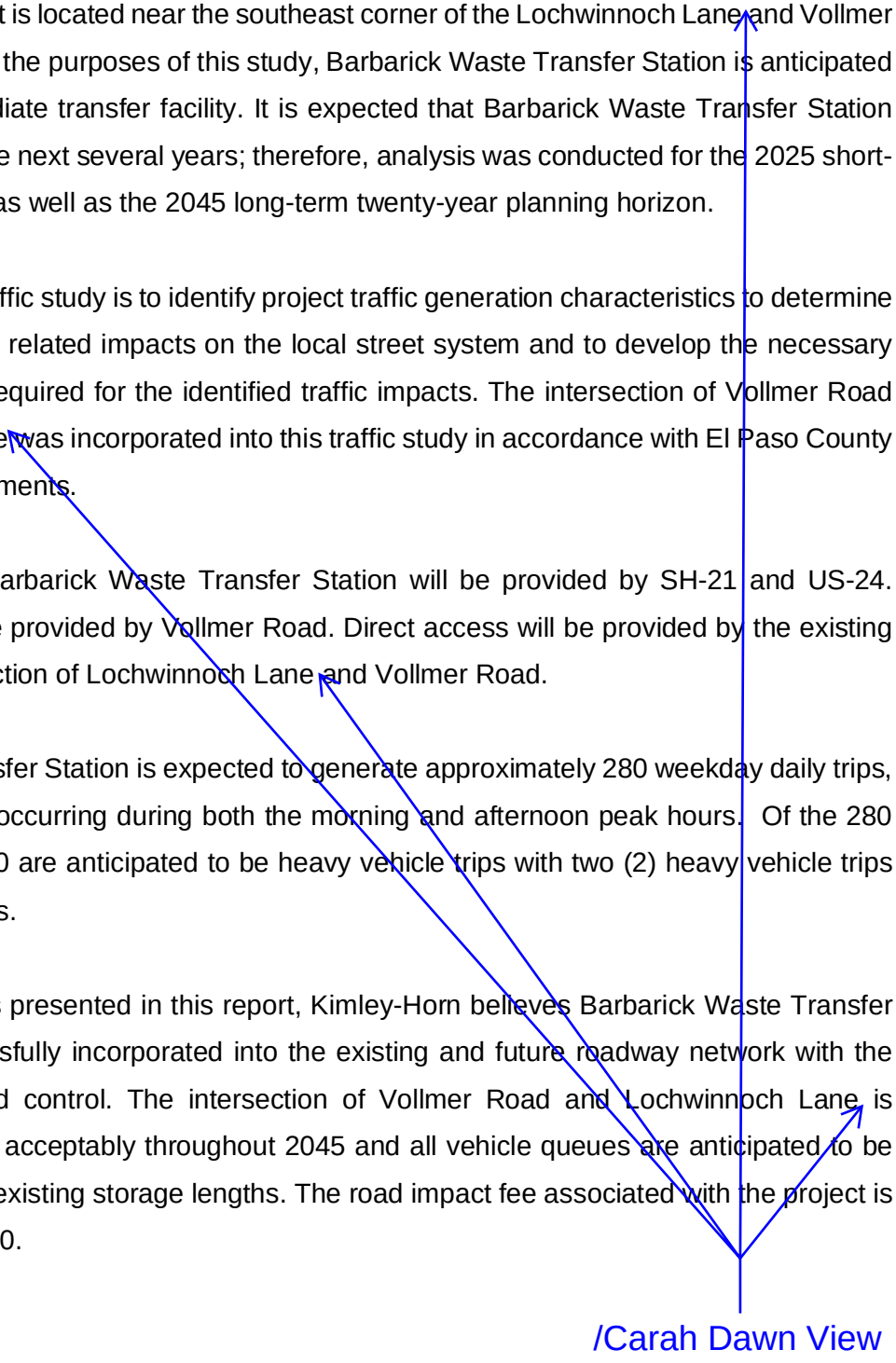
This report has been prepared to document the results of a Traffic Impact Study for the Barbarick Waste Transfer Station project proposed at 8812 Cliff Allen Point in El Paso County, Colorado. Specifically, the project is located near the southeast corner of the Lochwinnoch Lane and Vollmer Road intersection. For the purposes of this study, Barbarick Waste Transfer Station is anticipated to include an intermediate transfer facility. It is expected that Barbarick Waste Transfer Station will be completed in the next several years; therefore, analysis was conducted for the 2025 short-term buildout horizon as well as the 2045 long-term twenty-year planning horizon.

The purpose of this traffic study is to identify project traffic generation characteristics to determine potential project traffic related impacts on the local street system and to develop the necessary mitigation measures required for the identified traffic impacts. The intersection of Vollmer Road and Lochwinnoch Lane was incorporated into this traffic study in accordance with El Paso County standards and requirements.

Regional access to Barbarick Waste Transfer Station will be provided by SH-21 and US-24. Primary access will be provided by Vollmer Road. Direct access will be provided by the existing east leg at the intersection of Lochwinnoch Lane and Vollmer Road.

Barbarick Waste Transfer Station is expected to generate approximately 280 weekday daily trips, with 36 of these trips occurring during both the morning and afternoon peak hours. Of the 280 weekday daily trips, 10 are anticipated to be heavy vehicle trips with two (2) heavy vehicle trips during both peak hours.

Based on the analysis presented in this report, Kimley-Horn believes Barbarick Waste Transfer Station will be successfully incorporated into the existing and future roadway network with the existing geometry and control. The intersection of Vollmer Road and Lochwinnoch Lane is anticipated to operate acceptably throughout 2045 and all vehicle queues are anticipated to be maintained within the existing storage lengths. The road impact fee associated with the project is expected to be $22,380.

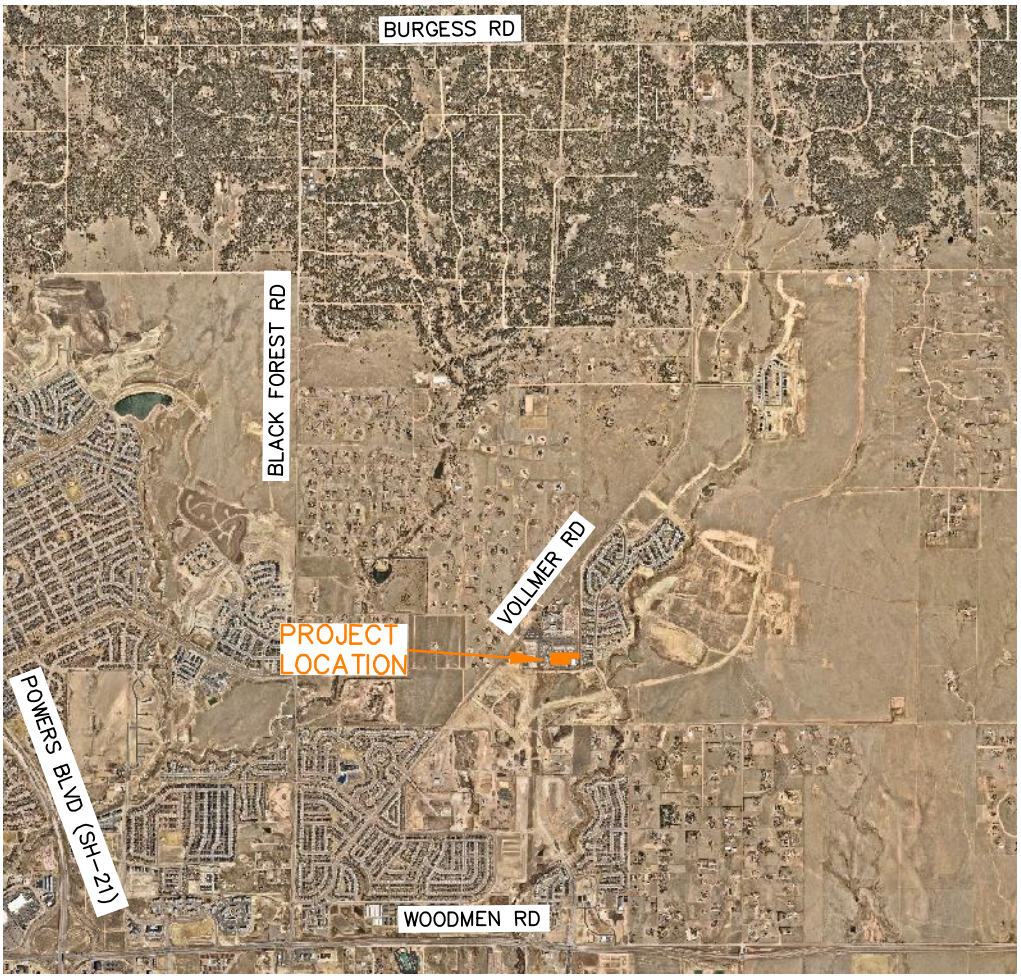


2.0 INTRODUCTION

Kimley-Horn and Associates, Inc. has prepared this report to document the results of a Traffic Impact Study for the Barbarick Waste Transfer Station project proposed at 8812 Cliff Allen Point in El Paso County, Colorado. Specifically, the project is located near the southeast corner of the Lochwinnoch Lane and Vollmer Road intersection. A vicinity map illustrating the Barbarick Waste Transfer Station development location is shown in **Figure 1**. For the purposes of this study, Barbarick Waste Transfer Station is anticipated to include an intermediate transfer facility. A conceptual site plan is attached in **Appendix D**. It is expected that Barbarick Waste Transfer Station will be completed in the next couple years; therefore, analysis was conducted for the 2025 short-term buildout horizon as well as the 2045 long-term twenty-year planning horizon.

The purpose of this traffic study is to identify project traffic generation characteristics to determine potential project traffic related impacts on the local street system and to develop the necessary mitigation measures required for the identified traffic impacts. The intersection of Vollmer Road and Lochwinnoch Lane was incorporated into this traffic study in accordance with El Paso County standards and requirements.

Regional access to Barbarick Waste Transfer Station will be provided by SH-21 and US-24. Primary access will be provided by Vollmer Road. Direct access will be provided by the existing east leg at the intersection of Lochwinnoch Lane and Vollmer Road.



BARBARICK WASTE TRANSFER STATION
EL PASO COUNTY, COLORADO
VICINITY MAP

FIGURE 1

3.0 EXISTING AND FUTURE CONDITIONS

3.1 Existing Study Area

The existing site is comprised of a diesel engine repair service. West of the site are single family homes. East of the site is vacant land that is currently being developed. Vacant land, industrial uses, and single-family homes are located to the south. An RV and boat storage facility is located to the north of the site.

Discuss how the site is currently accessed.

3.2 Existing Roadway Network

Vollmer Road provides two through lanes of travel in each direction, northeastbound and southwestbound, with a 45 mile per hour speed limit through the study area. Lochwinnoch Lane consists of one through lane in each direction extending primarily eastbound and westbound at the study area key intersection.

one at Lochwinnoch/Carah Dawn View?

/Carah Dawn View

separate

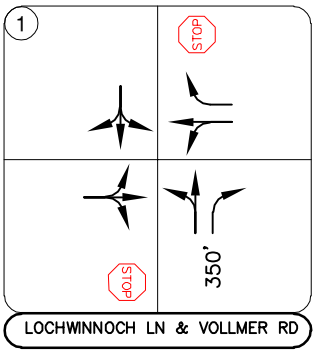
/Carah Dawn View

The unsignalized intersection of Lochwinnoch Lane and Vollmer Road operates with stop-control on the eastbound Lochwinnoch Lane and westbound Carah Dawn View approaches. For the purposes of this analysis, Vollmer Road is considered a north/south roadway while Lochwinnoch Lane is considered an east/west roadway. The northbound and westbound approaches provide a shared left turn/through lane and a right turn lane. The southbound and eastbound approaches provide one shared lane for all movements. An aerial photo of the existing intersection configuration is below (north is up - typical).

Lochwinnoch Lane & Vollmer Road

The intersection lane configuration and control for the study area intersection are shown in **Figure 2**.

Kimley»Horn
NORTH
NTS 196489000



LEGEND

X — Study Area Key Intersection

STOP — Stop Controlled Approach

SPEED LIMIT XX — Roadway Speed Limit

100' — Turn Lane Length (feet)

BARBARICK WASTE TRANSFER STATION
EL PASO COUNTY, COLORADO
EXISTING GEOMETRY AND CONTROL

FIGURE 2

Kimley»Horn

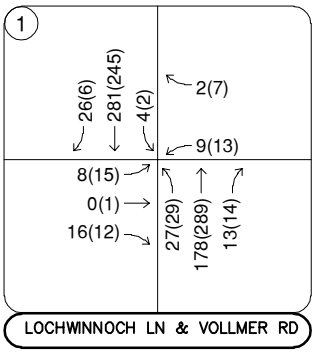
3.3 Existing Traffic Volumes

Existing turning movement counts were conducted at the study intersection on Thursday, August 25, 2022, during the morning and afternoon peak hours. The counts were conducted during the morning and afternoon peak hours of adjacent street traffic in 15-minute intervals from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM on this count date. The existing intersection traffic volumes are shown in **Figure 3** with count sheets provided in **Appendix A**.

3.4 Unspecified Development Traffic Growth

According to the 2040 traffic projections from the El Paso County Major Transportation Corridor Plan (MTCP) traffic model compared to the existing traffic volumes, the area surrounding the site is expected to have an average 18-year growth factor of 1.43. This growth factor equates to an annual growth rate of 1.99 percent. Future traffic volume projections and growth rate calculations are provided in **Appendix B**. Therefore, a 1.99 percent annual growth rate was used to calculate future traffic volumes at the study area intersection. This annual growth rate was used to estimate short-term 2025 and long-term 2045 traffic volume projections at the key intersection. The calculated background traffic volumes for 2025 and 2045 are shown in **Figure 4** and **Figure 5,** respectively.

Provide list of recent traffic studies. Sterling Ranch is one: https://epcdevplanreview.com/Public/ProjectDetails/180813



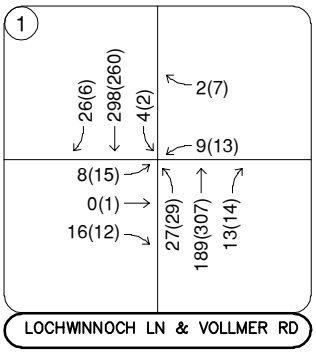
Thursday, August 25, 2022
7:00 to 8:00AM (4:15 to 5:15PM)

LEGEND

(X)	Study Area Key Intersection
XXX(XXX)	Weekday AM(PM) Peak Hour Traffic Volumes
XX,X00	Estimated Daily Traffic Volume

BARBARICK WASTE TRANSFER STATION
EL PASO COUNTY, COLORADO
2022 EXISTING TRAFFIC VOLUMES

FIGURE 3

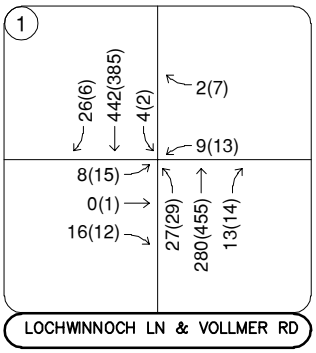


LEGEND

(X)	Study Area Key Intersection
XXX(XXX)	Weekday AM(PM) Peak Hour Traffic Volumes
XX,X00	Estimated Daily Traffic Volume

BARBARICK WASTE TRANSFER STATION
EL PASO COUNTY, COLORADO
2025 BACKGROUND TRAFFIC VOLUMES

FIGURE 4



LEGEND

(X)	Study Area Key Intersection
XXX(XXX)	Weekday AM(PM) Peak Hour Traffic Volumes
XX,X00	Estimated Daily Traffic Volume

BARBARICK WASTE TRANSFER STATION
EL PASO COUNTY, COLORADO
2045 BACKGROUND TRAFFIC VOLUMES

FIGURE 5

4.0 PROJECT TRAFFIC CHARACTERISTICS

4.1 Trip Generation

Site-generated traffic estimates are determined through a process known as trip generation. Rates and equations are applied to the proposed land use to estimate traffic generated by the development during a specific time interval. The acknowledged source for trip generation rates is the *Trip Generation Manual*[1] published by the Institute of Transportation Engineers (ITE). ITE has established trip rates in nationwide studies of similar land uses. However, for this study, Kimley-Horn used user-specific trip generation based on trips at a similar Peak Disposal and Recycling facility located at 856 Washington Street in Monument, Colorado, for traffic associated with the development. Further, steel recycling collection data from Colorado Industrial Recycling located at 2730 E. Las Vegas Street in Colorado Springs as well as data from the Green for Life trash collection facility were used for site generated traffic. Trips at the existing site were collected daily from August 2018 to July 2022. To be conservative, the month with highest number of trips, June 2022, was used for the trip generation. Of note, operations significantly decrease during the winter season and colder months. The operations primarily consist of personal vehicles utilizing the site to unload waste or recycle steel materials while trucks with 40-yard dumpster containers will haul out recycled steel and waste. The peak month for waste trucks occurred in June 2022 with 73 trucks collecting waste from the facility and hauling off-site. Likewise, the peak month for steel recycling trucks occurred in June 2022 with 7 trucks collecting recycled steel and hauling off-site. Further, trips generated on the existing diesel engine repair site were not subtracted from the existing counts to conservatively evaluate the key intersection.

Barbarick Waste Transfer Station is expected to generate approximately 280 weekday daily trips, with 36 of these trips occurring during both the morning and afternoon peak hours. Of the 280, weekday daily trips, 10 trips are anticipated to be heavy vehicle trips with two (2) heavy vehicle trips during both peak hours. **Table 1** summarizes the estimated trip generation for the Barbarick Waste Transfer Station.

[1] Institute of Transportation Engineers, *Trip Generation Manual*, Eleventh Edition, Washington DC, 2021.

Table 1 – Barbarick Waste Transfer Station Traffic Generation

Vehicle and Trip Type	Weekday Vehicle Trips						
	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Passenger Vehicle Trash/Recycle Drop-off	270	17	17	34	17	17	34
Truck - GFL Boxes Picked up	8	1	1	2	1	1	2
Truck - Recycled Steel Pick up	2	0	0	0	0	0	0
Total Site Generated Trips	**280**	**18**	**18**	**36**	**18**	**18**	**36**

4.2 Trip Distribution

Distribution of site traffic on the street system was based on the area street system characteristics, existing traffic patterns, existing and anticipated surrounding demographic information, and the proposed access system for the project. The directional distribution of traffic is a means to quantify the percentage of site-generated traffic that approaches the site from a given direction and departs the site back to the original source. The project trip distribution for the proposed development is illustrated in **Figure 6**.

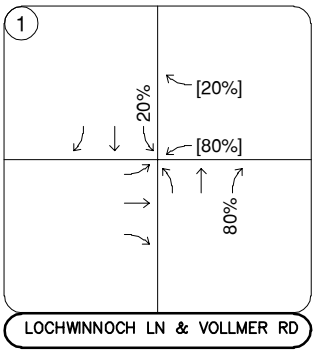
4.3 Traffic Assignment

Barbarick Waste Transfer Station traffic assignment was obtained by applying the project trip distribution to the estimated traffic generation of the development shown in **Table 1**. Traffic assignment is shown in **Figure 7.**

4.4 Total (Background Plus Project) Traffic

Site traffic volumes were added to the background volumes to represent estimated traffic conditions for the short-term 2025 buildout horizon and long-term 2045 twenty-year planning horizon. These total traffic volumes for the study area are illustrated for the 2025 and 2045 horizon years in **Figures 8** and **9**, respectively.

Kimley»Horn
NORTH
NTS 196489000



LEGEND

(X) Study Area Key Intersection

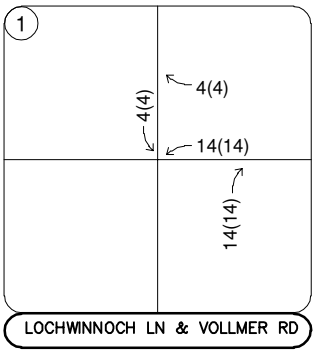
XX% External Trip Distribution Percentage

XX%[XX%] Entering[Exiting] Trip Distribution Percentage

BARBARICK WASTE TRANSFER STATION
EL PASO COUNTY, COLORADO
PROJECT TRIP DISTRIBUTION

FIGURE 6

Kimley»Horn



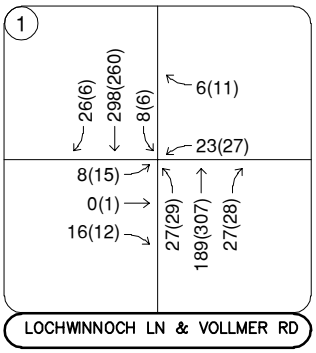
LEGEND

(X)	Study Area Key Intersection
XXX(XXX)	Weekday AM(PM) Peak Hour Traffic Volumes
XX,X00	Estimated Daily Traffic Volume

BARBARICK WASTE TRANSFER STATION
EL PASO COUNTY, COLORADO
PROJECT TRAFFIC ASSIGNMENT

FIGURE 7

Kimley»Horn
NORTH
NTS 196489000



LEGEND

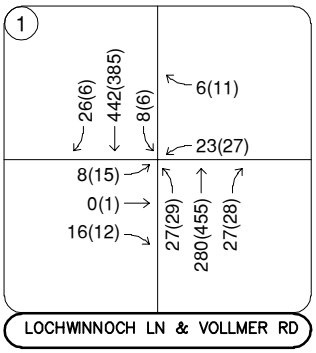
(X)	Study Area Key Intersection
XXX(XXX)	Weekday AM(PM) Peak Hour Traffic Volumes
XX,X00	Estimated Daily Traffic Volume

BARBARICK WASTE TRANSFER STATION
EL PASO COUNTY, COLORADO
2025 TOTAL TRAFFIC VOLUMES

FIGURE 8

Kimley»Horn

Kimley»Horn
NORTH
NTS 196489000



LEGEND

(X)	Study Area Key Intersection
XXX(XXX)	Weekday AM(PM) Peak Hour Traffic Volumes
XX,X00	Estimated Daily Traffic Volume

BARBARICK WASTE TRANSFER STATION
EL PASO COUNTY, COLORADO
2045 TOTAL TRAFFIC VOLUMES

FIGURE 9

Kimley»Horn

5.0 TRAFFIC OPERATIONS ANALYSIS

Kimley-Horn's analysis of traffic operations in the site vicinity was conducted to determine potential capacity deficiencies in the 2025 and 2045 development horizons at the identified key intersection. The acknowledged source for determining overall capacity is the current edition of the *Highway Capacity Manual (HCM)*[2].

5.1 Analysis Methodology

Capacity analysis results are listed in terms of Level of Service (LOS). LOS is a qualitative term describing operating conditions a driver will experience while traveling on a particular street or highway during a specific time interval. It ranges from A (very little delay) to F (long delays and congestion). Based on El Paso County standards, the threshold for acceptable LOS is not less than LOS D during peak hours. **Table 2** shows the definition of level of service for signalized and unsignalized intersections.

Table 2 – Level of Service Definitions

Level of Service	Signalized Intersection Average Total Delay (sec/veh)	Unsignalized Intersection Average Total Delay (sec/veh)
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

Definitions provided from the Highway Capacity Manual, Sixth Edition, Transportation Research Board, 2016.

The study area intersection was analyzed based on average total delay analysis for unsignalized intersections. Under the unsignalized analysis, the LOS for a two-way stop-controlled intersection is determined by the computed or measured control delay and is defined for each minor movement.

[2] Transportation Research Board, *Highway Capacity Manual*, Sixth Edition, Washington DC, 2016.

5.2 Key Intersection Operational Analysis

Calculations for the operational level of service at the key intersection for the study area are provided in **Appendix C**. The existing year analysis is based on the lane geometry and intersection control shown in **Figure 2.** Existing peak hour factors were used for all horizons. Additionally, truck percentages were used for all horizons. Synchro traffic analysis software was used to analyze the unsignalized key intersection for HCM level of service.

Lochwinnoch Lane & Vollmer Road

The unsignalized intersection of Lochwinnoch Lane and Vollmer Road operates with stop-control on the eastbound and westbound Vollmer Road approaches. The intersection movements operate acceptably at LOS C or better during both peak hours under existing conditions. With project traffic, all movements are anticipated to continue operating at an acceptable level of service throughout the 2045 horizon. Therefore, no improvements or modifications are anticipated to be needed at this intersection based on the addition of project traffic and this operational level of service analysis. **Table 3** provides the results of the LOS analysis conducted at this intersection.

Table 3 – Lochwinnoch Lane & Vollmer Road LOS Results

Scenario	AM Peak Hour		PM Peak Hour	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
2022 Existing				
Northbound Left	8.2	A	7.9	A
Eastbound Approach	12.6	B	13.3	B
Westbound Through/Left	16.1	C	15.5	C
Westbound Right	9.5	A	10.0	B
Southbound Left	7.8	A	8.0	A
2025 Background				
Northbound Left	8.3	A	7.9	A
Eastbound Approach	12.9	B	13.7	B
Westbound Through/Left	16.8	C	16.2	C
Westbound Right	9.6	A	10.2	B
Southbound Left	7.8	A	8.0	A
2025 Background Plus Project				
Northbound Left	8.3	A	7.9	A
Eastbound Approach	13.1	B	14.0	B
Westbound Through/Left	17.8	C	16.9	C
Westbound Right	9.6	A	10.2	B
Southbound Left	7.9	A	8.1	A
2045 Background				
Northbound Left	8.9	A	8.3	A
Eastbound Approach	16.7	C	18.6	C
Westbound Through/Left	24.5	C	13.3	C
Westbound Right	10.3	B	11.4	B
Southbound Left	8.1	A	8.5	A
2045 Background Plus Project				
Northbound Left	8.9	A	8.3	A
Eastbound Approach	17.0	C	19.0	C
Westbound Through/Left	27.1	D	25.4	D
Westbound Right	10.3	B	11.4	B
Southbound Left	8.2	A	8.5	A

5.3 El Paso County Turn Lane Requirement Analysis

The El Paso County Engineering Criteria Manual (ECM) was used to determine if left and right turn lanes are warranted along Vollmer Road. El Paso County classifies Vollmer Road as a Minor Arterial roadway. According to El Paso County ECM guidelines for Minor Arterials, a left turn lane is required for any access with a projected peak hour left turning volume of 25 vehicles per hour or greater, a right turn lane is required for any access with a projected peak hour right turning volume of 50 vehicles per hour or greater, and a right turn acceleration lane is generally not required.

Based on Vollmer Road providing a posted speed limit of 45 miles per hour, the turn lane requirements that the project traffic contributes to are as follows:

Lochwinnoch Lane and Vollmer Road:

- A southbound left turn lane **is not** warranted at this intersection based on projected 2045 total traffic volumes being eight (8) southbound left turns during the peak hour and the threshold being 25 vehicles per hour.

- A northbound right turn lane exists but **is not** warranted at this intersection based on projected 2045 total traffic volumes being 28 northbound right turns during the peak hour and the threshold being 50 vehicles per hour.

5.4 Vehicle Queuing Analysis

A vehicle queuing analysis was conducted for the study area intersection. The queuing analysis was performed using Synchro presenting the results of the 95th percentile queue lengths. Results are shown in the following **Table 4** with calculations provided within the level of service operational sheets of **Appendix C**.

Table 4 – Turn Lane Queuing Analysis Results

Intersection Turn Lane	Existing Turn Lane Length (feet)	2025 Calculated Queue (feet)	2025 Recommended Length (feet)	2045 Calculated Queue (feet)	2045 Recommended Length (feet)
Lochwinnoch Ln & Vollmer Rd					
Northbound Right	350’	0’	350’	0’	350’
Westbound Left/Through	100’	25’	100’	25’	100’
Westbound Right	C	25’	C	25’	C

C = Continuous Lane

As shown in the table above, vehicle queues are all anticipated to remain within the existing turn lane lengths through 2045.

5.5 Sight Distance Evaluation

It is recommended that sight triangles be provided at all site access points to give drivers exiting the site a clear view of oncoming traffic. Landscaping and objects within sight triangles must not obstruct drivers’ views of the adjacent travel lanes. ECM design sight distances for left turn from stop from public street intersections (Table 2-21) was evaluated at the intersection of Vollmer Road and Lochwinnoch Lane. ECM does not provide sight distances for right-turning vehicles from stop for public street intersections; therefore, AASHTO standards were used for right-turn from stop distances at the intersection of Vollmer Road and Lochwinnoch Lane.

According to Table 2-21 from ECM and a roadway design speed of 45 miles per hour along Vollmer Road, the intersection sight distance for a vehicle turning left from stop is 500 feet for a two-lane roadway. With AASHTO standards, the sight distance for a vehicle turning right from stop is 430 feet. Therefore, all obstructions for left turning vehicles from stop should be clear to the right within the triangle created with a vertex point located 10 feet from the edge of the major road traveled way (typical position of the minor road driver’s eye when stopped) and a line-of-sight distance of 500 feet located in the middle of the nearest southbound through lane along

Vollmer Road. Likewise, all obstructions for right turning vehicles from stop should be clear to the left within the triangle created with a vertex point located 10 feet from the edge of the major road traveled way and a line-of-sight distance of 430 feet located in the middle of the nearest northbound through lane along Vollmer Road. It is believed that the intersection of Vollmer Road and Lochwinnoch Lane is appropriately located to provide necessary sight distances.

5.6 Bicycle and Pedestrian Access

Sidewalks are not present on either side of the Vollmer Road and Lochwinnoch Lane intersection. Sidewalks and bicycle lanes are not provided along Vollmer Road or Lochwinnoch Road.

5.7 Road Impact Fees

Road impact fees were evaluated based on the El Paso County Road Impact Fee Schedule. Based on these fee schedule guidelines, the fee per 1,000 square feet of Warehouse is $1,865. Therefore, the road impact fee for the proposed 12,000 square foot building is expected to be $22,380. Road impact fee calculations are shown in **Table 5**.

Table 5 – Road Impact Fees

Use	Units	Fee / Unit	Total Fee
Warehouse	12.00 KSF	$1,865	$22,380

During the final plat process, the project team will determine if the impact fees are paid up front or if the property will be included in one of the available public improvement districts with reduced upfront costs. The project team will determine payment methods with the final plat.

The land use the road impact fee shall be based on is industrial. Please revise road impact fee calculations.

5.8 Heavy Vehicle Assessment

The heavy vehicle percentage adjacent to the intersection of Lochwinnoch Lane and Vollmer Road is currently 6.2 percent during the morning peak hour and 4.4 percent during the afternoon peak hour. An industry standard 10 percent K-factor was utilized to estimate an average daily traffic volume of 6,100 vehicles per day along Vollmer Road. The afternoon heavy vehicle percentage of 4.4 percent was utilized to estimate a daily heavy vehicle estimate of 268 trucks (6,100 x 0.044). The project is anticipated to add 10 daily truck trips during the peak day of the peak month. This equates to a 3.7 percent (10/268) increase in the overall number of daily trucks along Vollmer Road. However, the heavy vehicle usage of 4.4 percent along Vollmer Road remains the same due to the small number of trucks added daily by this project. This is due to passenger vehicles generated by the project being added to Vollmer Road as well as trucks and the overall truck percentage along Vollmer Road remaining the same ((268 existing trucks + 10 project trucks) / (6,100 existing vehicles + 280 project vehicles)). It should also be noted that this is calculated with the highest project generated volume day in the entire calendar year and the not the average project generation. Therefore, an approximate total of five heavy vehicles (10 trips) are expected to be added to the roadway network on a peak day, and this is expected to have a negligible impact to the surrounding roadway.

Address the ownership and condition of Carah Dawn View and Cliff Allen Point to the site, width, shoulders, pavement condition and thickness, etc. access and sight distance requirements at the site. Does it meet minimum ECM requirements for the volume and type of traffic proposed? If maintenance or improvements need to be done on the road, who will do it?

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis presented in this report, Kimley-Horn believes Barbarick Waste Transfer Station will be successfully incorporated into the existing and future roadway network with the existing geometry and control. The intersection of Vollmer Road and Lochwinnoch Lane is anticipated to operate acceptably throughout 2045 and all vehicle queues are anticipated to be maintained within the existing storage lengths. The road impact fee associated with the project is expected to be $22,380.

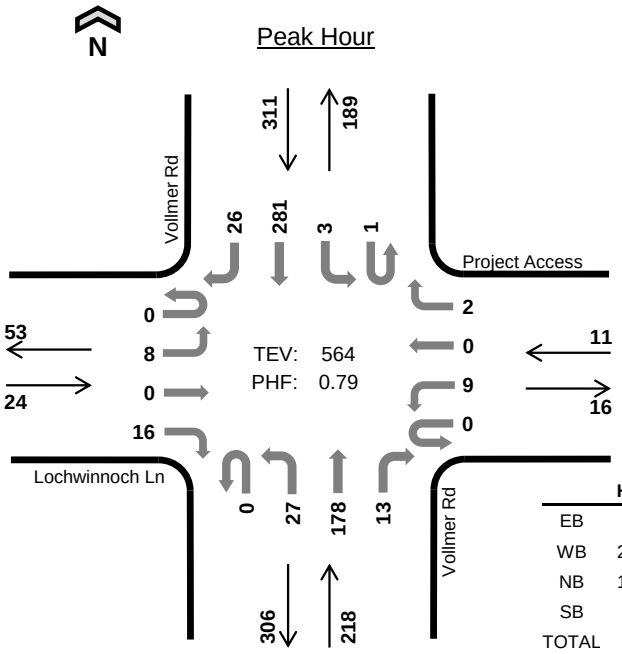
APPENDICES

APPENDIX A

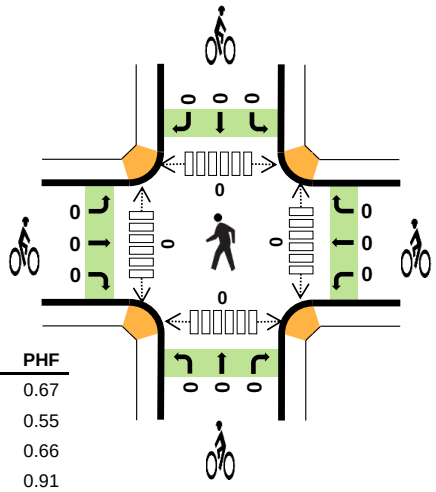
Intersection Count Sheets

Vollmer Rd
Lochwinnoch Ln

Date: 08/25/2022
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:00 AM to 8:00 AM



	HV %:	PHF
EB	4.2%	0.67
WB	27.3%	0.55
NB	11.5%	0.66
SB	1.9%	0.91
TOTAL	6.2%	0.79



Two-Hour Count Summaries

Interval Start	Lochwinnoch Ln Eastbound				Project Access Westbound				Vollmer Rd Northbound				Vollmer Rd Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	**0**	**1**	**0**	**3**	**0**	**1**	**0**	**0**	**0**	**5**	**36**	**3**	**0**	**0**	**70**	**7**	**126**	0
7:15 AM	**0**	**2**	**0**	**7**	**0**	**3**	**0**	**2**	**0**	**5**	**47**	**0**	**1**	**1**	**76**	**2**	**146**	0
7:30 AM	**0**	**1**	**0**	**4**	**0**	**1**	**0**	**0**	**0**	**4**	**29**	**6**	**0**	**0**	**65**	**4**	**114**	0
7:45 AM	**0**	**4**	**0**	**2**	**0**	**4**	**0**	**0**	**0**	**13**	**66**	**4**	**0**	**2**	**70**	**13**	**178**	**564**
8:00 AM	0	5	0	3	0	1	0	0	0	3	53	2	0	0	43	9	119	557
8:15 AM	0	1	0	5	0	2	0	0	0	1	40	5	0	0	32	2	88	499
8:30 AM	0	2	0	2	0	4	0	1	0	3	42	3	0	1	47	0	105	490
8:45 AM	0	2	0	6	0	3	0	0	0	4	43	0	0	0	51	1	110	422
Count Total	0	18	0	32	0	19	0	3	0	38	356	23	1	4	454	38	986	0
Peak Hour All	**0**	**8**	**0**	**16**	**0**	**9**	**0**	**2**	**0**	**27**	**178**	**13**	**1**	**3**	**281**	**26**	**564**	**0**
Peak Hour HV	**0**	**1**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**2**	**21**	**2**	**0**	**1**	**4**	**1**	**35**	**0**
Peak Hour HV%	**-**	**13%**	**-**	**0%**	**-**	**33%**	**-**	**0%**	**-**	**7%**	**12%**	**15%**	**0%**	**33%**	**1%**	**4%**	**6%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	**0**	**0**	**5**	**1**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:15 AM	**1**	**0**	**8**	**2**	***11***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:30 AM	**0**	**1**	**7**	**2**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**0**	**2**	**5**	**1**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:00 AM	0	1	7	1	*9*	0	0	0	0	*0*	0	0	0	0	*0*
8:15 AM	1	1	5	1	*8*	0	0	0	0	*0*	0	0	0	0	*0*
8:30 AM	0	2	3	2	*7*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	0	0	3	1	*4*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	2	7	43	11	*63*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	**1**	**3**	**25**	**6**	***35***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Lochwinnoch Ln				Project Access				Vollmer Rd				Vollmer Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**0**	**1**	**6**	0
7:15 AM	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**0**	**0**	**1**	**1**	**0**	**11**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**4**	**1**	**0**	**0**	**2**	**0**	**10**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**4**	**1**	**0**	**0**	**1**	**0**	**8**	**35**
8:00 AM	0	0	0	0	0	1	0	0	0	0	6	1	0	0	1	0	9	38
8:15 AM	0	0	0	1	0	1	0	0	0	0	4	1	0	0	1	0	8	35
8:30 AM	0	0	0	0	0	1	0	1	0	0	3	0	0	1	1	0	7	32
8:45 AM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	4	28
Count Total	0	1	0	1	0	6	0	1	0	2	37	4	0	2	8	1	63	0
Peak Hour	**0**	**1**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**2**	**21**	**2**	**0**	**1**	**4**	**1**	**35**	**0**

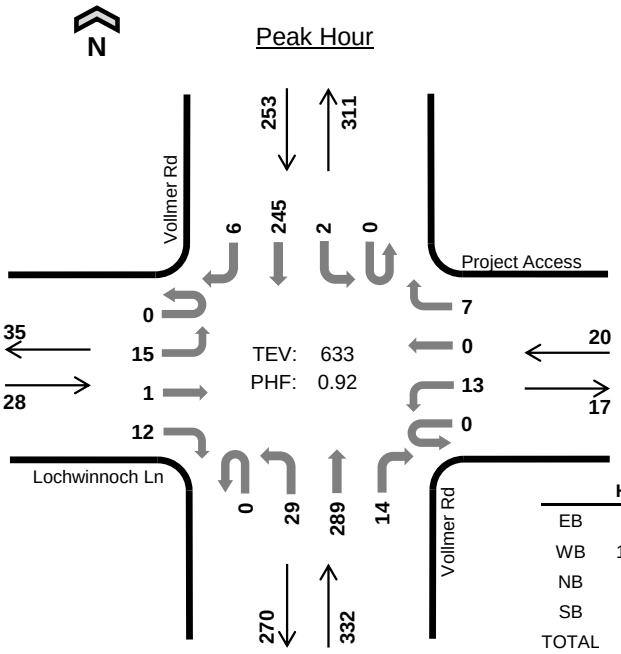
Two-Hour Count Summaries - Bikes

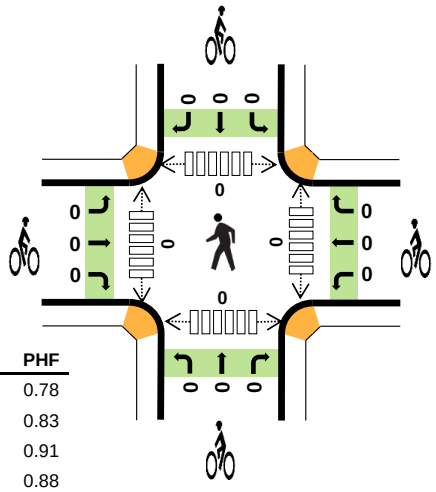
Interval Start	Lochwinnoch Ln			Project Access			Vollmer Rd			Vollmer Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Vollmer Rd
Lochwinnoch Ln

Date: 08/25/2022
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:15 PM to 5:15 PM





	HV %:	PHF
EB	3.6%	0.78
WB	10.0%	0.83
NB	3.6%	0.91
SB	5.1%	0.88
TOTAL	4.4%	0.92

Two-Hour Count Summaries

Interval Start	Lochwinnoch Ln Eastbound				Project Access Westbound				Vollmer Rd Northbound				Vollmer Rd Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	1	0	5	0	3	0	1	0	7	52	2	0	0	51	1	123	0
4:15 PM	**0**	**3**	**0**	**3**	**0**	**3**	**0**	**2**	**0**	**5**	**68**	**3**	**0**	**0**	**63**	**3**	**153**	0
4:30 PM	**0**	**3**	**0**	**6**	**0**	**2**	**0**	**4**	**0**	**6**	**80**	**3**	**0**	**0**	**59**	**1**	**164**	0
4:45 PM	**0**	**2**	**1**	**2**	**0**	**4**	**0**	**0**	**0**	**10**	**78**	**3**	**0**	**2**	**69**	**1**	**172**	612
5:00 PM	**0**	**7**	**0**	**1**	**0**	**4**	**0**	**1**	**0**	**8**	**63**	**5**	**0**	**0**	**54**	**1**	**144**	**633**
5:15 PM	0	1	1	3	0	2	0	0	0	8	63	2	0	0	68	1	149	629
5:30 PM	0	2	0	4	0	5	2	2	0	6	62	1	0	1	41	4	130	595
5:45 PM	0	1	1	1	0	1	0	1	0	3	89	1	0	0	44	3	145	568
Count Total	0	20	3	25	0	24	2	11	0	53	555	20	0	3	449	15	1,180	0
Peak Hour All	**0**	**15**	**1**	**12**	**0**	**13**	**0**	**7**	**0**	**29**	**289**	**14**	**0**	**2**	**245**	**6**	**633**	**0**
Peak Hour HV	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**0**	**11**	**1**	**0**	**1**	**11**	**1**	**28**	**0**
Peak Hour HV%	**-**	**0%**	**0%**	**8%**	**-**	**8%**	**-**	**14%**	**-**	**0%**	**4%**	**7%**	**-**	**50%**	**4%**	**17%**	**4%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	1	1	6	*8*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	**1**	**1**	**6**	**2**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:30 PM	**0**	**1**	**3**	**1**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:45 PM	**0**	**0**	**1**	**6**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:00 PM	**0**	**0**	**2**	**4**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
5:15 PM	0	0	0	2	*2*	0	0	0	0	*0*	0	0	0	0	*0*
5:30 PM	0	0	1	3	*4*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	0	0	0	3	*3*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	1	3	14	27	*45*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	**1**	**2**	**12**	**13**	***28***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Lochwinnoch Ln				Project Access				Vollmer Rd				Vollmer Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	6	0	8	0
4:15 PM	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**6**	**0**	**0**	**0**	**2**	**0**	**10**	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**2**	**1**	**0**	**0**	**1**	**0**	**5**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**4**	**1**	**7**	30
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**4**	**0**	**6**	**28**
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	20
5:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	0	4	19
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	15
Count Total	0	0	0	1	0	2	0	1	0	1	12	1	0	1	25	1	45	0
Peak Hour	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**0**	**11**	**1**	**0**	**1**	**11**	**1**	**28**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	Lochwinnoch Ln			Project Access			Vollmer Rd			Vollmer Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

APPENDIX B

Future Traffic Projections

MTCP Growth Rate: Barbarick Waste Transfer Station

Location	2022 AADT	2040 AADT	Growth Factor	Growth Rate
Vollmer Rd S/O Burgess Rd	6100	8700	1.43	1.99%

APPENDIX C

Intersection Analysis Worksheets

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	0	16	9	0	2	27	178	13	4	281	26
Future Vol, veh/h	8	0	16	9	0	2	27	178	13	4	281	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	350	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	10	0	20	11	0	3	34	225	16	5	356	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	686	692	373	686	692	225	389	0	0	241	0	0
Stage 1	383	383	-	293	293	-	-	-	-	-	-	-
Stage 2	303	309	-	393	399	-	-	-	-	-	-	-
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	356	362	664	356	362	805	1148	-	-	1302	-	-
Stage 1	632	605	-	707	663	-	-	-	-	-	-	-
Stage 2	698	652	-	624	595	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	344	348	664	335	348	805	1148	-	-	1302	-	-
Mov Cap-2 Maneuver	344	348	-	335	348	-	-	-	-	-	-	-
Stage 1	611	602	-	683	640	-	-	-	-	-	-	-
Stage 2	672	630	-	602	592	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.6	14.9	1	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1148	-	-	507	335	805	1302	-	-
HCM Lane V/C Ratio	0.03	-	-	0.06	0.034	0.003	0.004	-	-
HCM Control Delay (s)	8.2	0	-	12.6	16.1	9.5	7.8	0	-
HCM Lane LOS	A	A	-	B	C	A	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0	0	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	1	12	13	0	7	29	289	14	2	245	6
Future Vol, veh/h	15	1	12	13	0	7	29	289	14	2	245	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	350	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	16	1	13	14	0	8	32	314	15	2	266	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	664	667	270	659	655	314	273	0	0	329	0	0
Stage 1	274	274	-	378	378	-	-	-	-	-	-	-
Stage 2	390	393	-	281	277	-	-	-	-	-	-	-
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	371	377	764	374	383	722	1279	-	-	1219	-	-
Stage 1	728	680	-	640	612	-	-	-	-	-	-	-
Stage 2	630	602	-	721	678	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	358	365	764	358	370	722	1279	-	-	1219	-	-
Mov Cap-2 Maneuver	358	365	-	358	370	-	-	-	-	-	-	-
Stage 1	705	679	-	620	593	-	-	-	-	-	-	-
Stage 2	604	583	-	706	677	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.3	13.6	0.7	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1279	-	-	464	358	722	1219	-	-
HCM Lane V/C Ratio	0.025	-	-	0.066	0.039	0.011	0.002	-	-
HCM Control Delay (s)	7.9	0	-	13.3	15.5	10	8	0	-
HCM Lane LOS	A	A	-	B	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0	0	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	0	16	9	0	2	27	189	13	4	298	26
Future Vol, veh/h	8	0	16	9	0	2	27	189	13	4	298	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	350	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	10	0	20	11	0	3	34	239	16	5	377	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	721	727	394	721	727	239	410	0	0	255	0	0
Stage 1	404	404	-	307	307	-	-	-	-	-	-	-
Stage 2	317	323	-	414	420	-	-	-	-	-	-	-
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	337	346	646	337	346	790	1128	-	-	1287	-	-
Stage 1	615	592	-	694	654	-	-	-	-	-	-	-
Stage 2	686	643	-	608	583	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	326	332	646	316	332	790	1128	-	-	1287	-	-
Mov Cap-2 Maneuver	326	332	-	316	332	-	-	-	-	-	-	-
Stage 1	593	589	-	670	631	-	-	-	-	-	-	-
Stage 2	660	620	-	586	580	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.9	15.5	1	0.1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1128	-	-	487	316	790	1287	-	-
HCM Lane V/C Ratio	0.03	-	-	0.062	0.036	0.003	0.004	-	-
HCM Control Delay (s)	8.3	0	-	12.9	16.8	9.6	7.8	0	-
HCM Lane LOS	A	A	-	B	C	A	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0	0	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↰	↗		↰	↗		↕	
Traffic Vol, veh/h	15	1	12	13	0	7	29	307	14	2	260	6
Future Vol, veh/h	15	1	12	13	0	7	29	307	14	2	260	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	350	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	16	1	13	14	0	8	32	334	15	2	283	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	701	704	287	696	692	334	290	0	0	349	0	0
Stage 1	291	291	-	398	398	-	-	-	-	-	-	-
Stage 2	410	413	-	298	294	-	-	-	-	-	-	-
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	351	359	747	353	365	703	1260	-	-	1199	-	-
Stage 1	713	668	-	624	599	-	-	-	-	-	-	-
Stage 2	615	590	-	706	666	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	338	347	747	337	353	703	1260	-	-	1199	-	-
Mov Cap-2 Maneuver	338	347	-	337	353	-	-	-	-	-	-	-
Stage 1	690	667	-	604	580	-	-	-	-	-	-	-
Stage 2	589	571	-	691	665	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.7	14.1	0.7	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1260	-	-	442	337	703	1199	-	-
HCM Lane V/C Ratio	0.025	-	-	0.069	0.042	0.011	0.002	-	-
HCM Control Delay (s)	7.9	0	-	13.7	16.2	10.2	8	0	-
HCM Lane LOS	A	A	-	B	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0	0	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	0	16	23	0	6	27	189	27	8	298	26
Future Vol, veh/h	8	0	16	23	0	6	27	189	27	8	298	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	350	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	10	0	20	29	0	8	34	239	34	10	377	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	742	755	394	731	737	239	410	0	0	273	0	0
Stage 1	414	414	-	307	307	-	-	-	-	-	-	-
Stage 2	328	341	-	424	430	-	-	-	-	-	-	-
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	327	333	646	332	341	790	1128	-	-	1267	-	-
Stage 1	608	586	-	694	654	-	-	-	-	-	-	-
Stage 2	676	632	-	600	577	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	313	318	646	310	325	790	1128	-	-	1267	-	-
Mov Cap-2 Maneuver	313	318	-	310	325	-	-	-	-	-	-	-
Stage 1	586	580	-	669	630	-	-	-	-	-	-	-
Stage 2	645	609	-	575	571	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.1	16.1	0.9	0.2
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1128	-	-	477	310	790	1267	-	-
HCM Lane V/C Ratio	0.03	-	-	0.064	0.094	0.01	0.008	-	-
HCM Control Delay (s)	8.3	0	-	13.1	17.8	9.6	7.9	0	-
HCM Lane LOS	A	A	-	B	C	A	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.3	0	0	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	1	12	27	0	11	29	307	28	6	260	6
Future Vol, veh/h	15	1	12	27	0	11	29	307	28	6	260	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	350	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	16	1	13	29	0	12	32	334	30	7	283	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	720	729	287	706	702	334	290	0	0	364	0	0
Stage 1	301	301	-	398	398	-	-	-	-	-	-	-
Stage 2	419	428	-	308	304	-	-	-	-	-	-	-
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	341	347	747	348	360	703	1260	-	-	1184	-	-
Stage 1	704	661	-	624	599	-	-	-	-	-	-	-
Stage 2	608	581	-	698	659	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	325	333	747	331	346	703	1260	-	-	1184	-	-
Mov Cap-2 Maneuver	325	333	-	331	346	-	-	-	-	-	-	-
Stage 1	681	656	-	604	580	-	-	-	-	-	-	-
Stage 2	579	562	-	680	654	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14	15	0.6	0.2
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1260	-	-	429	331	703	1184	-	-
HCM Lane V/C Ratio	0.025	-	-	0.071	0.089	0.017	0.006	-	-
HCM Control Delay (s)	7.9	0	-	14	16.9	10.2	8.1	0	-
HCM Lane LOS	A	A	-	B	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.3	0.1	0	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	0	16	9	0	2	27	280	13	4	442	26
Future Vol, veh/h	8	0	16	9	0	2	27	280	13	4	442	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	350	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	10	0	20	11	0	3	34	354	16	5	559	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1018	1024	576	1018	1024	354	592	0	0	370	0	0
Stage 1	586	586	-	422	422	-	-	-	-	-	-	-
Stage 2	432	438	-	596	602	-	-	-	-	-	-	-
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	212	232	509	212	232	681	964	-	-	1167	-	-
Stage 1	489	491	-	602	581	-	-	-	-	-	-	-
Stage 2	594	572	-	483	483	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	203	220	509	196	220	681	964	-	-	1167	-	-
Mov Cap-2 Maneuver	203	220	-	196	220	-	-	-	-	-	-	-
Stage 1	467	488	-	575	555	-	-	-	-	-	-	-
Stage 2	565	546	-	461	480	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.7	21.9	0.7	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	964	-	-	339	196	681	1167	-	-
HCM Lane V/C Ratio	0.035	-	-	0.09	0.058	0.004	0.004	-	-
HCM Control Delay (s)	8.9	0	-	16.7	24.5	10.3	8.1	0	-
HCM Lane LOS	A	A	-	C	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.2	0	0	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	1	12	13	0	7	29	455	14	2	385	6
Future Vol, veh/h	15	1	12	13	0	7	29	455	14	2	385	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	350	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	16	1	13	14	0	8	32	495	15	2	418	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	997	1000	422	992	988	495	425	0	0	510	0	0
Stage 1	426	426	-	559	559	-	-	-	-	-	-	-
Stage 2	571	574	-	433	429	-	-	-	-	-	-	-
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	221	241	627	223	245	571	1124	-	-	1045	-	-
Stage 1	602	582	-	510	508	-	-	-	-	-	-	-
Stage 2	502	500	-	597	581	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	211	231	627	211	234	571	1124	-	-	1045	-	-
Mov Cap-2 Maneuver	211	231	-	211	234	-	-	-	-	-	-	-
Stage 1	578	580	-	490	488	-	-	-	-	-	-	-
Stage 2	475	480	-	582	579	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.6	19.1	0.5	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1124	-	-	296	211	571	1045	-	-
HCM Lane V/C Ratio	0.028	-	-	0.103	0.067	0.013	0.002	-	-
HCM Control Delay (s)	8.3	0	-	18.6	23.3	11.4	8.5	0	-
HCM Lane LOS	A	A	-	C	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.2	0	0	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	0	16	23	0	6	27	280	27	8	442	26
Future Vol, veh/h	8	0	16	23	0	6	27	280	27	8	442	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	350	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	10	0	20	29	0	8	34	354	34	10	559	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1039	1052	576	1028	1034	354	592	0	0	388	0	0
Stage 1	596	596	-	422	422	-	-	-	-	-	-	-
Stage 2	443	456	-	606	612	-	-	-	-	-	-	-
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	205	223	509	209	228	681	964	-	-	1149	-	-
Stage 1	483	486	-	602	581	-	-	-	-	-	-	-
Stage 2	586	561	-	477	478	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	194	210	509	192	215	681	964	-	-	1149	-	-
Mov Cap-2 Maneuver	194	210	-	192	215	-	-	-	-	-	-	-
Stage 1	461	480	-	575	555	-	-	-	-	-	-	-
Stage 2	553	536	-	452	472	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17	23.6	0.7	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	964	-	-	330	192	681	1149	-	-
HCM Lane V/C Ratio	0.035	-	-	0.092	0.152	0.011	0.009	-	-
HCM Control Delay (s)	8.9	0	-	17	27.1	10.3	8.2	0	-
HCM Lane LOS	A	A	-	C	D	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.5	0	0	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↰	↗		↰	↗		↕	
Traffic Vol, veh/h	15	1	12	27	0	11	29	455	28	6	385	6
Future Vol, veh/h	15	1	12	27	0	11	29	455	28	6	385	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	350	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	16	1	13	29	0	12	32	495	30	7	418	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1016	1025	422	1002	998	495	425	0	0	525	0	0
Stage 1	436	436	-	559	559	-	-	-	-	-	-	-
Stage 2	580	589	-	443	439	-	-	-	-	-	-	-
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	215	233	627	219	242	571	1124	-	-	1032	-	-
Stage 1	595	576	-	510	508	-	-	-	-	-	-	-
Stage 2	497	492	-	590	575	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	203	222	627	206	230	571	1124	-	-	1032	-	-
Mov Cap-2 Maneuver	203	222	-	206	230	-	-	-	-	-	-	-
Stage 1	571	571	-	490	488	-	-	-	-	-	-	-
Stage 2	467	472	-	571	570	-	-	-	-	-	-	-

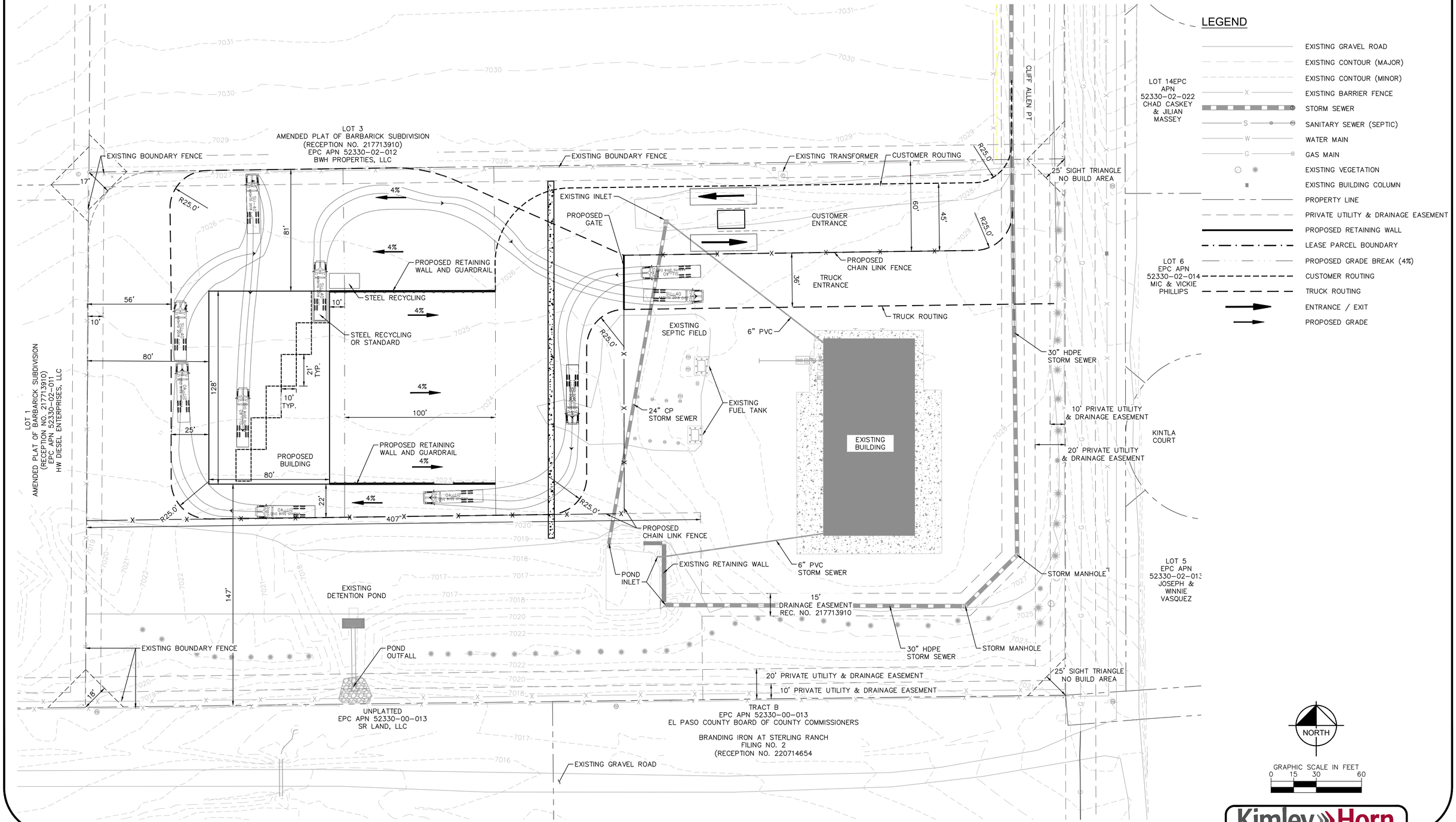
Approach	EB	WB	NB	SB
HCM Control Delay, s	19	21.3	0.5	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1124	-	-	287	206	571	1032	-	-
HCM Lane V/C Ratio	0.028	-	-	0.106	0.142	0.021	0.006	-	-
HCM Control Delay (s)	8.3	0	-	19	25.4	11.4	8.5	0	-
HCM Lane LOS	A	A	-	C	D	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.5	0.1	0	-	-

APPENDIX D

Conceptual Site Plan

BARBARICK WASTE TRANSFER STATION
SITE PLAN EXHIBIT



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