130 ENVIRONMENTAL PARK

APPENDIX IIC
TRANSPORTATION STUDY

BIGGS & MATHEWS ENVIRONMENTAL
Consulting Engineers • Hydrogeologists
Mansfield • Wichita Falls

August 30, 2013

Imelda Barrett, P.E.
Director of Operations
Texas Department of Transportation
Austin District
P.O. Drawer 15426
Austin, Texas 78761-5426

Re: 130 Environmental Park
Caldwell County, Texas
Documentation of Coordination

Dear Ms. Barrett:

On behalf of 130 Environmental Park, LLC, Biggs & Mathews Environmental, Inc. (BME) is preparing an application for the 130 Environmental Park, which includes a municipal solid waste landfill and transfer station to be located in northern Caldwell County, Texas. The purpose of this letter is to document coordination with the Texas Department of Transportation (TxDOT) consistent with the municipal solid waste regulations, 30 Administrative Code Chapter 330 (30TAC §330.61(i)(4). Additionally, we are requesting information regarding any proposed roadway improvements in the vicinity of the facility.

Lee Engineering has conducted a Traffic Impact Analysis (TIA) (copy attached) for the 130 Environmental Park and concluded existing roadway infrastructure has adequate capacity to accommodate site traffic. As shown on the attached drawing (Detailed Highway Map), the facility site entrance is located approximately 1,500 feet north of the intersection of US Highway 183 and Farm to Market Road 1185. As detailed in the Lee Engineering report, historical traffic count data from TxDOT Austin District's 2002-2011 count maps was used in the analysis. We are not aware of any TxDOT location restrictions that would be applicable to the proposed facility.

The 130 Environmental Park facility entrance is proposed to be constructed along with a right turn deceleration lane on US Highway 183, as shown in the TIA, and will be consistent with TxDOT *Access Management Manual* (effective July 2011) and requirements of the TxDOT Austin District. A TxDOT Driveway Permit will be obtained from the Austin District prior to construction of the proposed entrance and deceleration lane.

BME would like TxDOT to provide information regarding any traffic or location restrictions in the vicinity of the facility.

1700 Robert Road, Suite 100 • Mansfield, Texas 76063 • Phone: 817-563-1144 • Fax: 817-563-1224

Please call or e-mail me at 817-563-1144 or kwelch@biggsandmathews.com if you have any questions or need additional information.

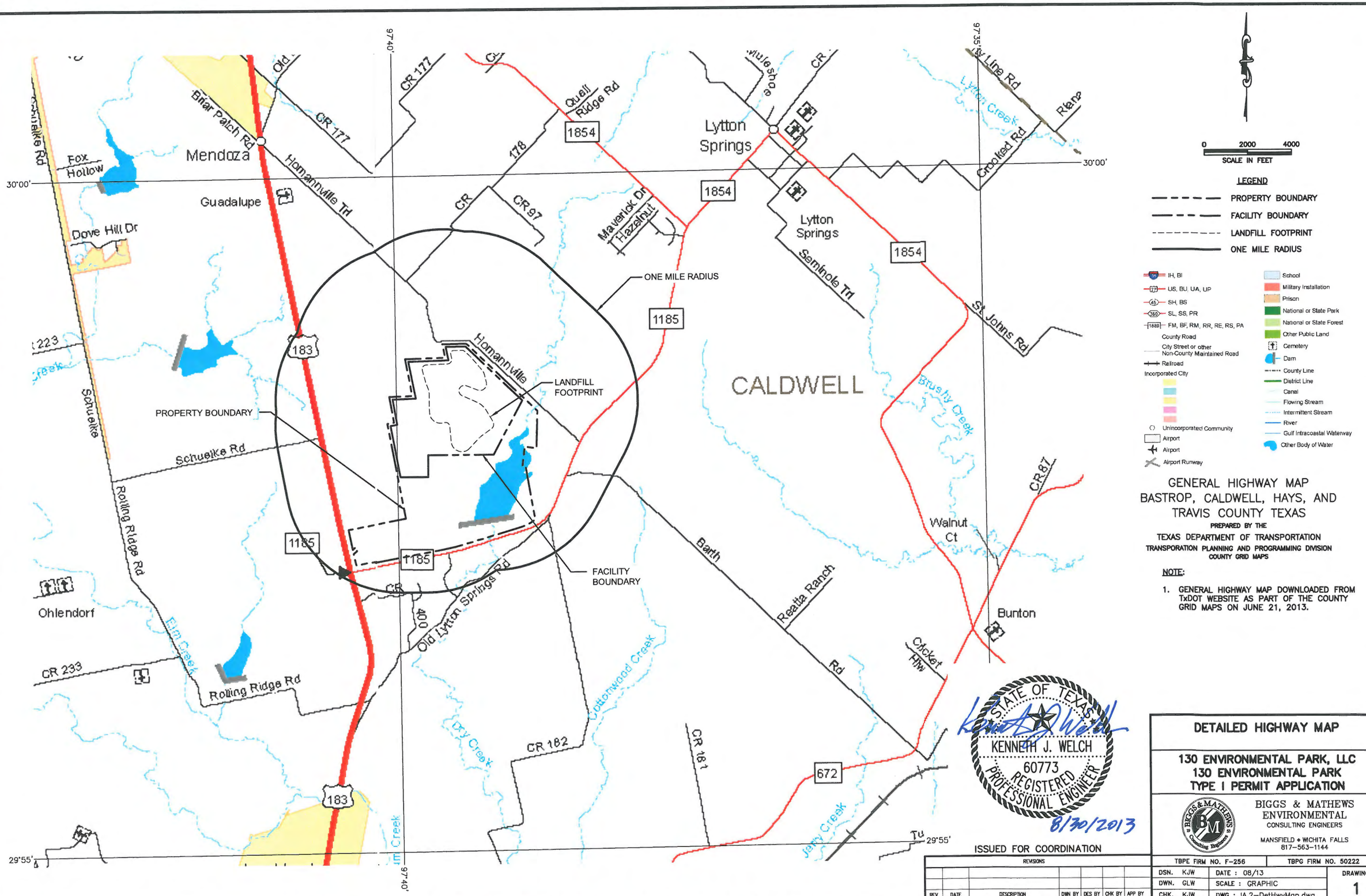
Sincerely,

BIGGS & MATHEWS ENVIRONMENTAL
TBPE No. F-256 ◆ TBPG No. 50222

Kenneth J. Welch, P.E.
Principal Engineer

Attachments: Detailed Highway Map
Traffic Impact Analysis for 130 Environmental Park

cc: Mr. John Denholm III, P.E., PTOE, Lee Engineering
Mr. Ernest Kaufmann, President and Manager of 130 Environmental Park, LLC



GENERAL HIGHWAY MAP
BASTROP, CALDWELL, HAYS, AND TRAVIS COUNTY TEXAS

PREPARED BY THE
TEXAS DEPARTMENT OF TRANSPORTATION
TRANSPORATION PLANNING AND PROGRAMMING DIVISION
COUNTY GRID MAPS

NOTE:

1. GENERAL HIGHWAY MAP DOWNLOADED FROM TxDOT WEBSITE AS PART OF THE COUNTY GRID MAPS ON JUNE 21, 2013.

STATE OF TEXAS
KENNETH J. WELCH
60773
REGISTERED PROFESSIONAL ENGINEER
8/30/2013

ISSUED FOR COORDINATION

REVISIONS						
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

DETAILED HIGHWAY MAP

130 ENVIRONMENTAL PARK, LLC
130 ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
MANSFIELD ◆ WICHITA FALLS
817-563-1144
TBPE FIRM NO. F-256 | TBPG FIRM NO. 50222

DSN. KJW	DATE : 08/13	DRAWING
DWN. GLW	SCALE : GRAPHIC	1
CHK. KJW	DWG : IA.2-DetHwyMap.dwg	

J:\129\06 130 Park\102\PART I\IA.2-DetHwyMap.dwg Layout: FAADWG1 User: gwhite

TRAFFIC IMPACT ANALYSIS FOR
130 ENVIRONMENTAL PARK
CALDWELL COUNTY, TEXAS

Prepared by:

LEE ENGINEERING

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Dallas, Texas 75234
(972) 248-3006
TBPE Firm # F-450

AUGUST 28, 2013

John Denholm III
8-28-2013

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INTRODUCTION

130 Environmental Park, LLC intends to permit and operate a new municipal solid waste facility in northern Caldwell County. The 130 Environmental Park will include a Type I municipal solid waste disposal facility and a Type V municipal solid waste transfer station. The purpose of this traffic report is to address traffic / transportation as required by TCEQ in support of a permit application for the 130 Environmental Park Type I municipal solid waste disposal facility and a registration application for the 130 Environmental Park Type V municipal solid waste transfer station facility. The permitted Type I landfill permit boundary and the registered Type V transfer station registration boundary are coincident. Both facilities will use the same access to US 183, a two-lane site driveway serving only the landfill and transfer station facilities. This traffic report addresses the requirements for both facilities within the 130 Environmental Park

The 130 Environmental Park has a single proposed access point to northbound US 183. The proposed access point is located approximately 1,500 feet north of FM 1185. The 130 Environmental Park is proposed to operate with hours for incoming waste hauling vehicles of 3:00 AM to 5:00 PM Monday through Friday during a typical week. No waste will be accepted at the facility after 5:00 PM. Limited operation of approximately seven (7) hours is anticipated on Saturdays. The facility is expected to be closed on Sundays.

Figure 1 presents a detailed highway map prepared for the site that depicts the general location of proposed development and the surrounding roadway network. A one-mile radius around the site is also shown on the figure.

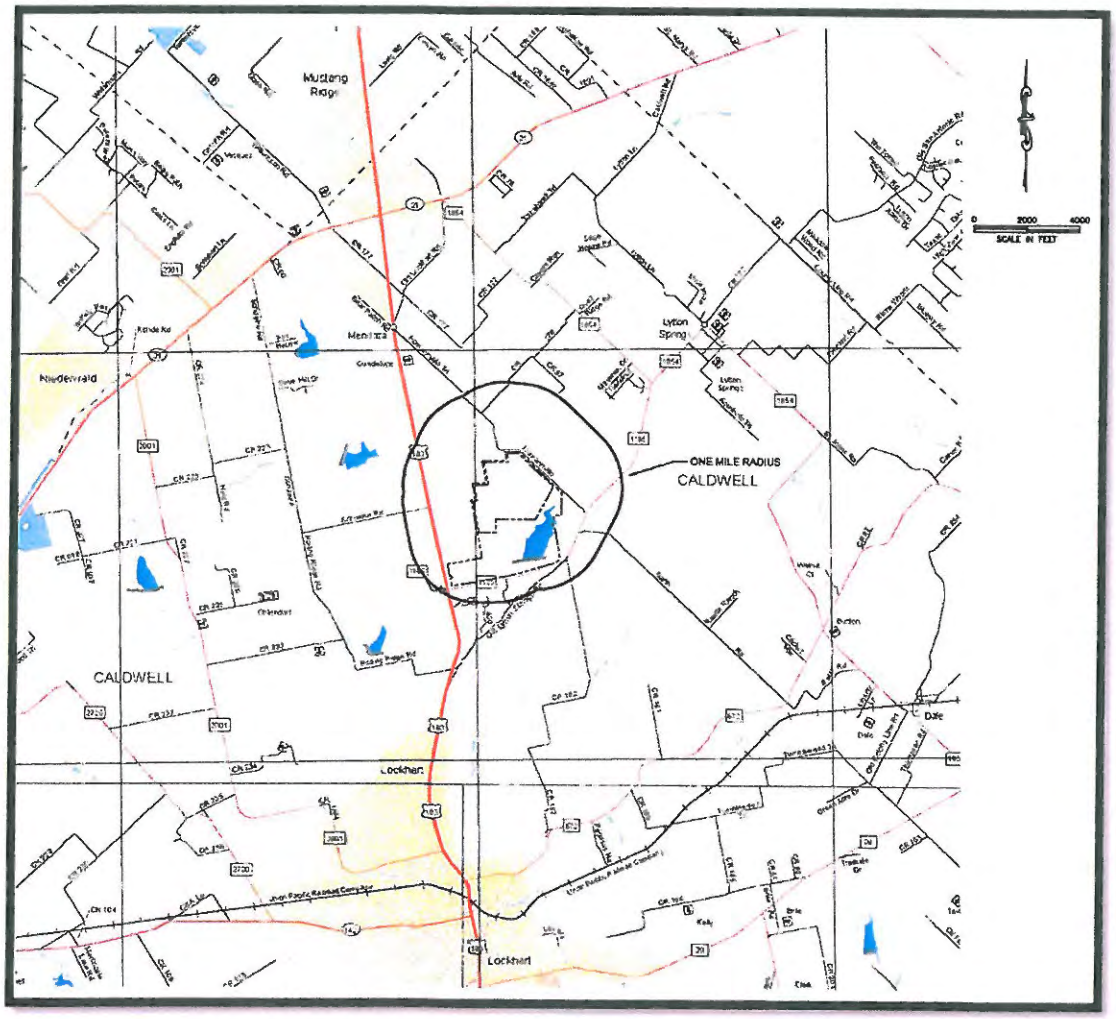
Three analysis years are addressed as part of this study:

2015 – the projected opening year (Build-out);
2020 – five years after the facility opens (Future); and
2064 – projected end of life of the facility (Horizon).

The end of life Horizon year analysis for the year 2064 was conducted and presented first due to the fact that if an intersection operates adequately under 2064 traffic volumes, then it will also do so under 2015 and 2020 volumes as well.

The end of life Horizon year of 2064 was selected based on the Texas Commission on the Environmental Quality (TCEQ) rule requiring analysis during the life of the facility.

Figure 1. Vicinity Map



While build-out and future year (five years after build out) analyses are commonplace in development traffic impact analyses, it should be noted that a horizon year of 50 years in the future is not typically standard practice. The Institute of Transportation Engineers (ITE), a professional society of traffic and transportation engineers, recommends that an analysis horizon of five to ten years be used for most site impact analyses. However, in this case, TCEQ requires this uncommon analysis.

The study area for this traffic study consisted of the access roads within one mile of the proposed facility, consisting of State Highway 130 (SH 130), US 183, Farm to Market Road 1185 (FM 1185) and Schuelke Road. A brief description of the existing area roadways is provided below:

> **State Highway 130** – State Highway 130 (SH 130) is a multi-lane tollway with a posted speed limit of 85 miles per hour in the vicinity of the site. SH 130 is an access controlled tolled freeway facility providing a connection between Seguin and Austin.

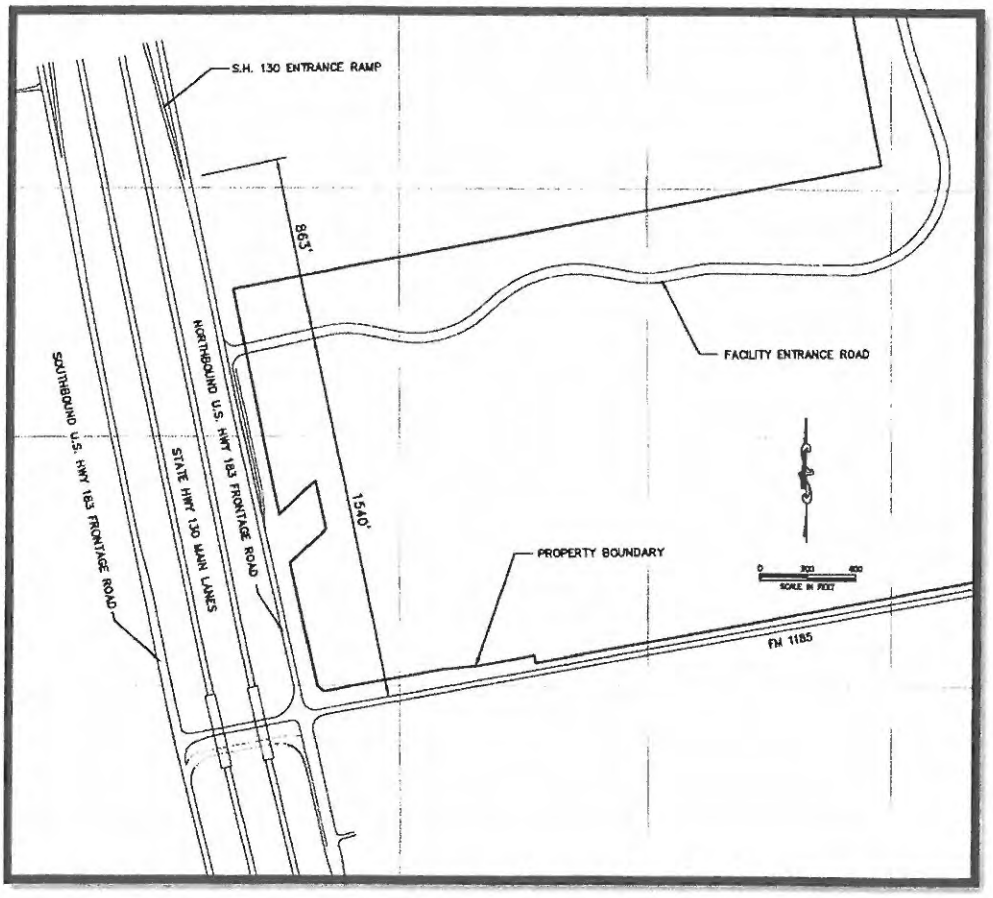
US 183 – US 183 has a posted speed limit of 65 miles per hour in the vicinity of the site. US 183 in the vicinity of the site functions as the frontage roads for SH 130 and provides access between local and collector roadways and the entry and exit ramps for SH 130.

Farm-to-Market Road 1185 – FM 1185 is a two lane undivided asphalt roadway south of the site. The FM 1185 intersections with US 183 are currently stop controlled along FM 1185 only, with US 183 having uncontrolled approaches. A traffic signal has been constructed at this location but currently operates in red/yellow flashing mode only. The posted speed limit on FM 1185 is 60 mph.

Schuelke Road – Schuelke Road is a two lane undivided roadway located north of the proposed 130 Environmental Park. Schuelke Road forms a tee intersection with northbound US 183. The US 183 intersections with Schuelke Road are currently uncontrolled with the Schuelke Road approaches being stop controlled. The posted speed limit on Schuelke Road is 35 mph.

Figure 2 depicts the proposed driveway on US 183 serving the 130 Environmental Park.

Figure 2: Site Plan



TRIP GENERATION, DISTRIBUTION AND ASSIGNMENT

Trip Generation

The Institute of Transportation Engineers publication *Trip Generation* is typically used to obtain estimates of the amount of vehicular trips generated by a specific land use. However, *Trip Generation* does not contain data on either a municipal solid waste disposal facility or a municipal solid waste transfer station facility land use. As such, representatives of 130 Environmental Park provided trip generation data based on the expected operation of the facility.

The majority of vehicles accessing the facility are expected to be waste route collection vehicles and waste transfer trucks. A route collection vehicle is approximately 35 feet long and is considered a single unit vehicle. A transfer truck is a semi-trailer combination vehicle with a 53 foot long trailer. The impact of single unit vehicles, such as busses and RVs, and combination vehicles, such as semi-trailers, on traffic operations is different than that of passenger cars. This is primarily due to the different acceleration, deceleration and handling characteristics of these larger vehicles.

The *Highway Capacity Manual* contains an adjustment factor to convert truck and bus volumes into passenger car equivalents. Using a passenger car equivalency adjustment factor of 1.5 for each truck, the trips generated by the landfill were converted into passenger car equivalents in order to estimate the traffic impacts of the facility. The adjusted daily trip generation data is also presented in **Table 1**.

The percentage of daily site traffic occurring during the analysis peak hours are presented in **Table 2**.

Table 1. Daily Trip Generation Data With Conversion to Passenger Car Equivalents

2015 Trip Generation (Build-out)						
Vehicle Types	Average Daily Trips (Actual Vehicles)			Average Daily Trips (Passenger car equivalents)		
	Enter	Exit	Total	Enter	Exit	Total
Route Collection Vehicles	110	110	220	165	165	330
Transfer Trucks	12	12	24	18	18	36
Small Loads (~1 ton)	25	25	50	38	38	76
Passenger Vehicles	28	28	56	28	28	56
Miscellaneous Trucks	4	4	8	6	6	12
TOTAL	179	179	358	255	255	510
2020 Trip Generation (Future)						
Vehicle Types	Average Daily Trips (Vehicles)			Average Daily Trips (Passenger car equivalents)		
	Enter	Exit	Total	Enter	Exit	Total
Route Collection Vehicles	119	119	238	178	178	357
Transfer Trucks	13	13	26	19	19	38
Small Loads (~1 ton)	27	27	54	41	41	82
Passenger Vehicles	30	30	60	30	30	60
Miscellaneous Trucks	5	5	10	8	8	16
TOTAL	194	194	388	276	276	553
2064 Trip Generation (Horizon)						
Vehicle Types	Average Daily Trips (Vehicles)			Average Daily Trips (Passenger car equivalents)		
	Enter	Exit	Total	Enter	Exit	Total
Route Collection Vehicles	237	237	474	356	356	711
Transfer Trucks	26	26	52	39	39	78
Small Loads (~1 ton)	54	54	108	81	81	162
Passenger Vehicles	60	60	120	60	60	120
Miscellaneous Trucks	9	9	18	13	13	26
TOTAL	386	386	772	549	549	1097

Trip Generation Data Source: 130 Environmental Park, LLC.

Because data for peak hour traffic generation or hourly generation for the proposed land uses is not contained in ITE's *Trip Generation* it was necessary to obtain information from the operator of the facility. 130 Environmental Park, LLC provided the percentage of daily site traffic that is expected to occur during each hour of a typical operational day. This distribution of traffic over the day allows the estimation of traffic generated by the site during any specific hour.

Traffic operations during the traditional AM and PM peak periods of the adjacent street are typically analyzed within a traffic study for a development. Traffic operations are analyzed for the peak one hour within each peak period. The AM peak hour selected for analysis was 7:00 AM to 8:00 AM based on the traffic counts collected and the site trip generation characteristics. The PM peak hour of the adjacent street was determined to occur between 4:15 PM and 5:15 PM based on the automated traffic counts collected.

The facility is anticipated to generate the highest amount of traffic during the 10:00 AM to 11:00 AM hour with 10.6% of the daily site generated traffic occurring during this hour. The 10:00 AM to 11:00 AM hour was selected for analysis as the peak hour of the generator. **Table 2** presents the percentage of daily traffic accessing the facility during each analysis hour.

Table 2: Percentage of Daily Traffic Accessing Site

Period	Hour	Percentage of Daily Site Traffic During the Analysis Hour[2]
AM Peak Hour of US 183[1]	0700-0800	7.3 %
PM Peak Hour of US 183[1]	1600-1700	6.7 %
Peak Hour of Facility[3]	1000-1100	10.6 %

1 - Peak hour based on traffic counts collected 5/15/2013
2 - Hourly Percentage Data for Site provided by 130 Environmental Park, LLC
3 - Projected peak hour of the facility provided by 130 Environmental Park, LLC

The passenger car equivalent volumes from Table 1 were then multiplied by the hourly percentages to determine the amount of traffic accessing the site during the three analysis peak hours. This results in the hourly trip generation presented in Table 3.

Table 3: Hourly Trip Generation in Passenger Car Equivalents

2015 Trip Generation (Build-out) (Passenger car equivalents)								
AM Peak Hour (7.3% of Daily)			PM Peak Hour (6.7% of Daily)			Facility Peak Hour (10.6% of Daily)		
Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
18	18	36	17	17	34	27	27	54
2020 Trip Generation (Future) (Passenger car equivalents)								
AM Peak Hour (7.3% of Daily)			PM Peak Hour (6.7% of Daily)			Facility Peak Hour (10.6% of Daily)		
Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
20	20	40	19	19	38	29	29	59
2064 Trip Generation (Horizon) (Passenger car equivalents)								
AM Peak Hour (7.3% of Daily)			PM Peak Hour (6.7% of Daily)			Facility Peak Hour (10.6% of Daily)		
Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
40	40	80	37	37	74	58	58	116

The volumes shown above are the passenger car equivalent volumes for the site that were used in all traffic analyses. The predicted number of actual vehicles accessing the site is lower than the equivalent number shown in Table 3. This results in a conservative estimate of site impact.

Trip Distribution

The distribution of site generated traffic entering and leaving the development on the area roadways was prepared based on the locations of principal roadways and information provided by 130 Environmental Park, LLC. The site will have a single proposed access point on US 183, a one-way northbound frontage road. Thus, all site traffic will enter the site by making a northbound right turn into the site, and all traffic will exit the site by making a westbound right turn out of the site.

- 65% of site traffic is estimated to access/egress the site to/from the north
  - 33% of site traffic is estimated to access/egress the site via US 183
  - 32% of site traffic is estimated to access/egress the site via SH 130
- 35% of site traffic is estimated to access/egress the site to/from the south
  - 35% of site traffic will access/egress the site to/from the site via US 183

The directional distribution was used to assign site traffic to the adjacent roadway network and the site driveway.

Traffic Assignment

Traffic volumes expected to be generated by the 130 Environmental Park were assigned to the area roadways and the site driveway based on the directional distribution described above.

The 2015 (Build-out) site-generated traffic volumes are provided in **Figure 3**.

The 2020 (Future) site-generated traffic volumes are provided in **Figure 4**.

The 2064 (Horizon) site-generated traffic volumes are provided in **Figure 5**.

Figure 3. 2015 (Build-out) Site Generated Traffic Volumes (Passenger car equivalents)

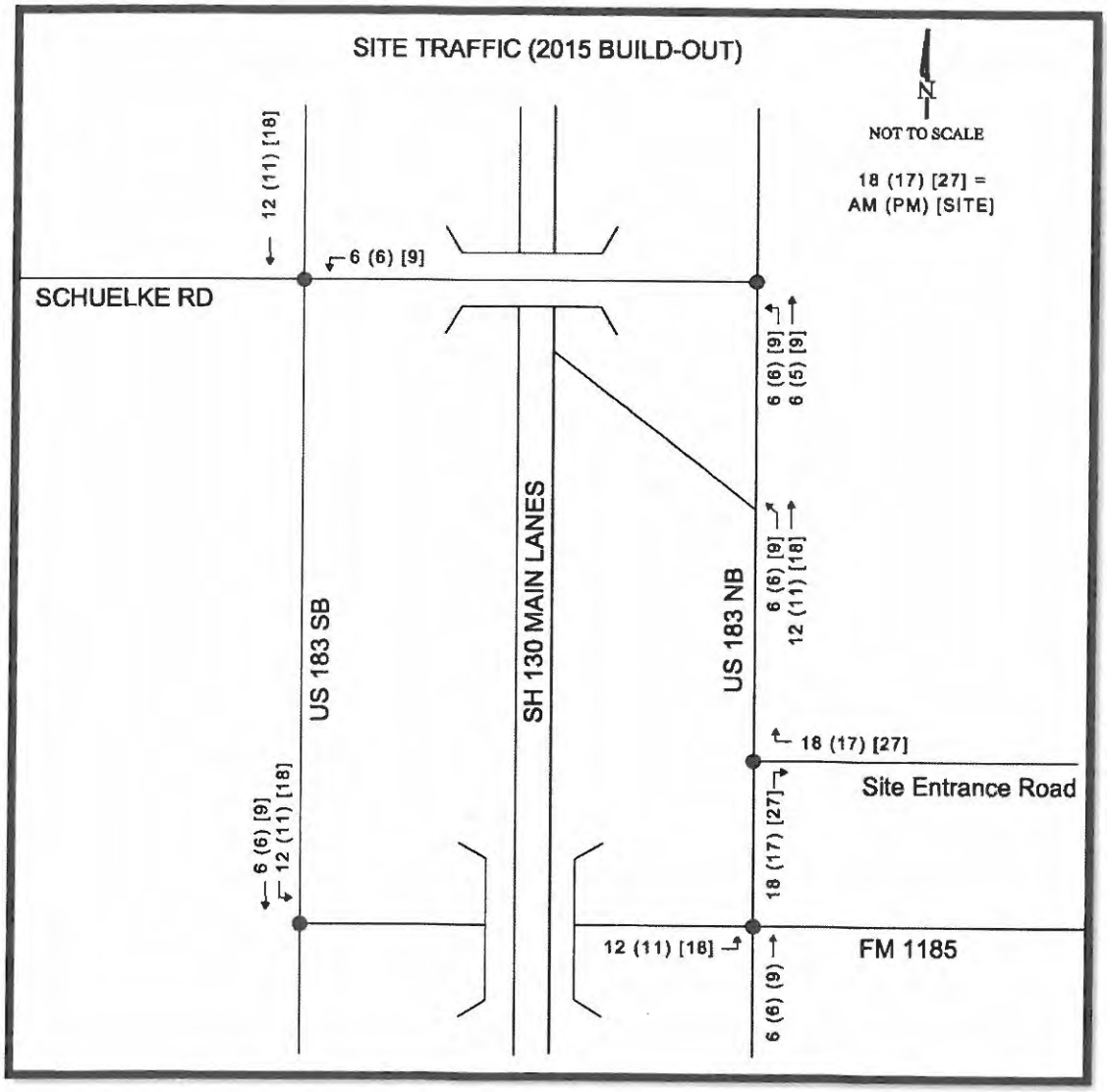


Figure 4. 2020 (Future) Site Generated Traffic Volumes (Passenger car equivalents)

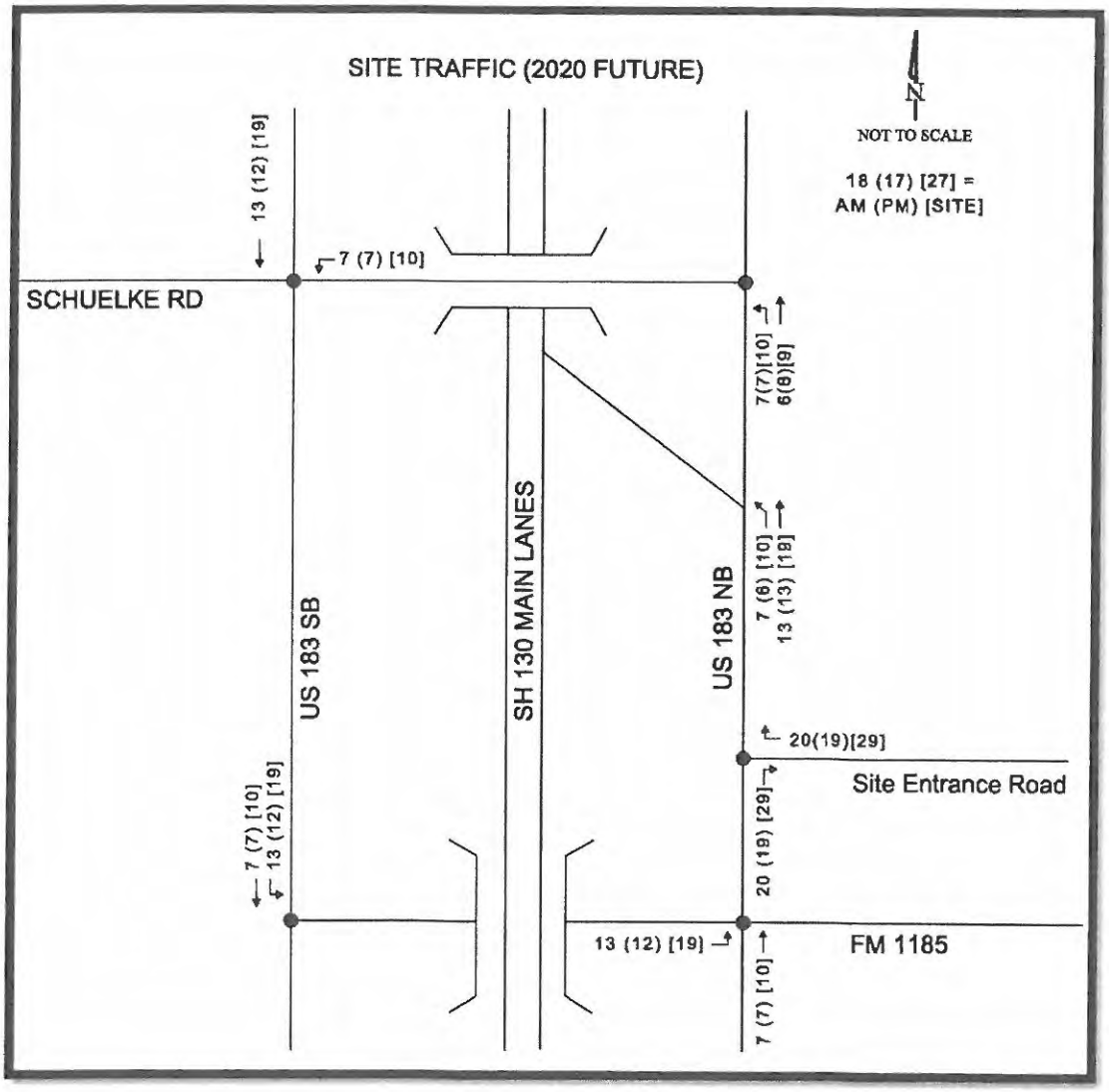
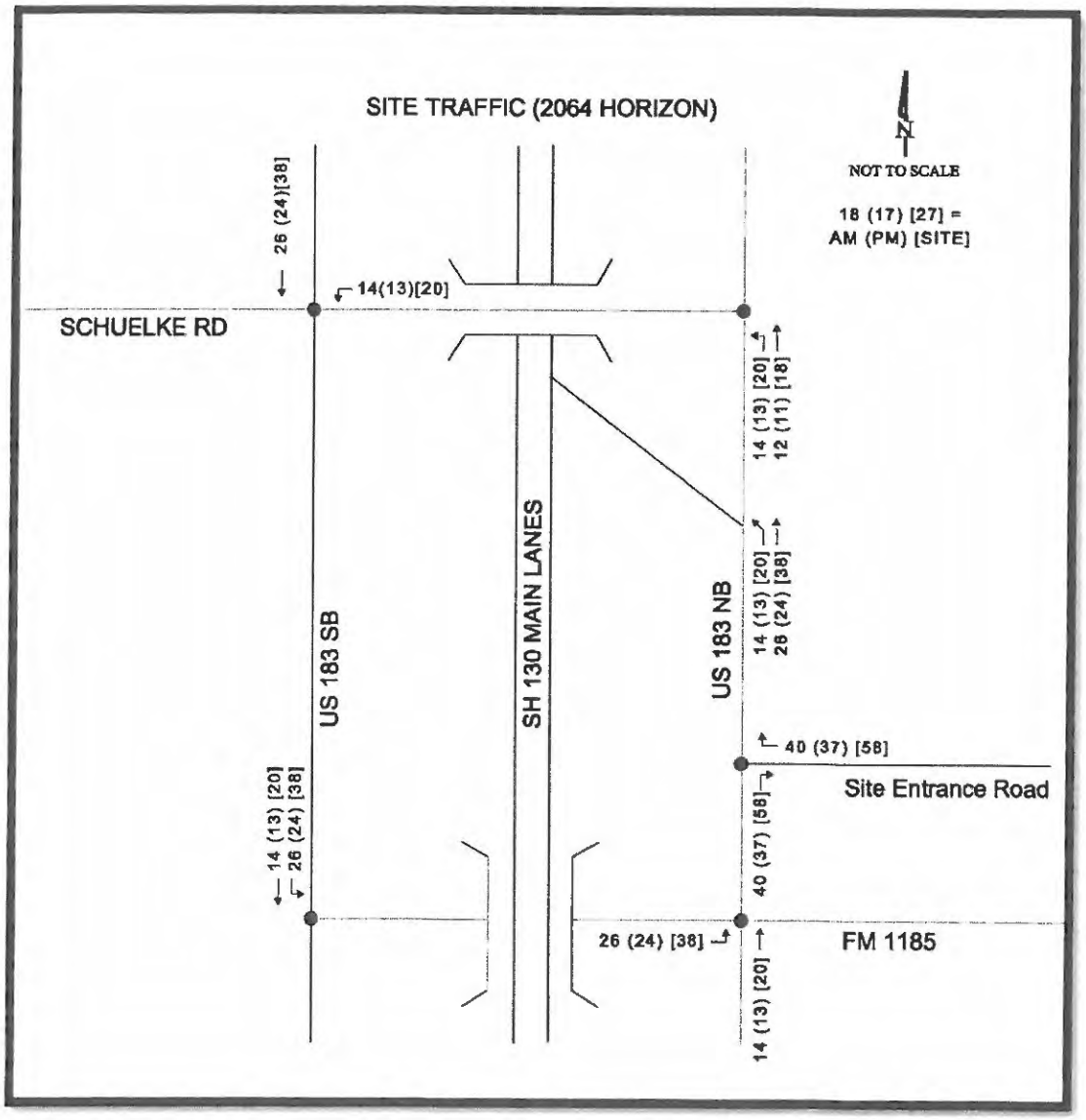


Figure 5. 2064 (Horizon) Site Generated Traffic Volumes (Passenger car equivalents)



EXISTING AND PROJECTED TRAFFIC VOLUMES

Existing Volumes

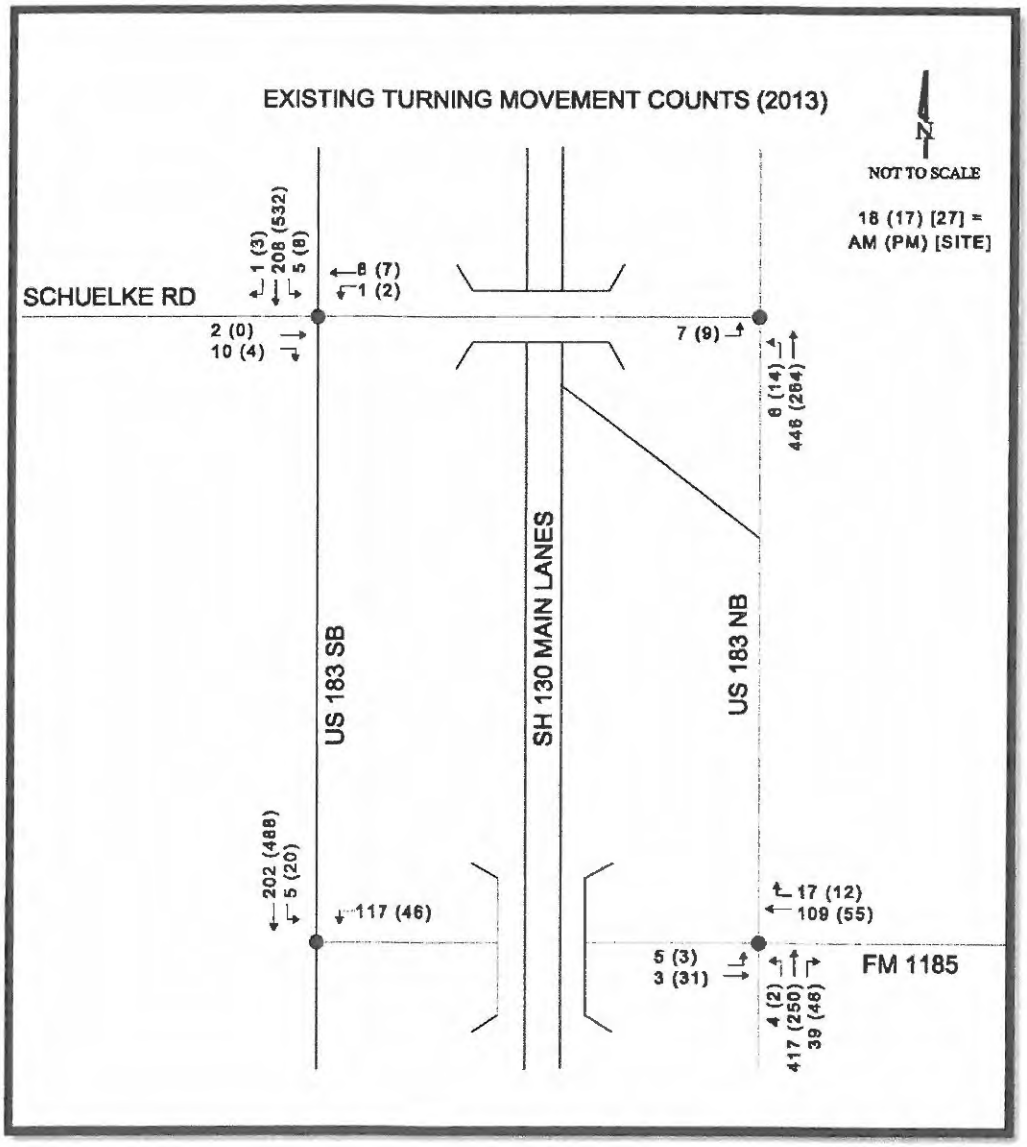
Twenty-four hour automated traffic counts were collected on US 183 in the vicinity of the site as well as on the SH 130 main lanes on Wednesday, May 15, 2013. Additional counts were also collected along FM 1185 and Schuelke Road in the vicinity of the intersections with US 183. The 24-hour counts collected are summarized in **Table 4**.

Table 4: Automated Traffic Volumes Collected

Location	Travel Direction	24 Hour Volume	AM Peak Volume (0700-0800)	Facility Peak Hour Volume (1000-1100)	PM Peak Volume (1600-1700)
US 183 Northbound South of FM 1185	NB	4,704	479	218	323
US 183 Southbound North of FM 1185	SB	4,058	235	223	422
SH 130 Main Lanes Near FM 1185	NB	4,407	245	343	291
	SB	5,232	285	337	422
Schuelke Road West of US 183	EB	94	13	9	6
	WB	86	10	3	13
FM 1185 East of US 183	EB	658	28	31	83
	WB	646	154	53	51

Manual turning movement counts for the AM and PM peak periods were also collected at the intersections of FM 1185 and US 183 and at the intersections of Schuelke Road with US 183. Figure 6 presents the existing turning movement counts collected Thursday, May 16, 2013.

Figure 6. Existing Turning Movement Counts



Historical Traffic Volume Data

Historical count data for the area was obtained from TxDOT Austin District count maps for 2002 through 2011. An image excerpt from the 2011 count map appears in **Figure 7**. At the time of this study, 2012 count maps were not yet available.

This image shows the three historical count locations depicted in Table 5 circled in red. Because the count location on US 183 north of FM 1185 was new for 2011 and no historical data is available for it from other count maps, it is not included in Table 5.

Figure 7: TxDOT 2011 Historical Count Map Excerpt

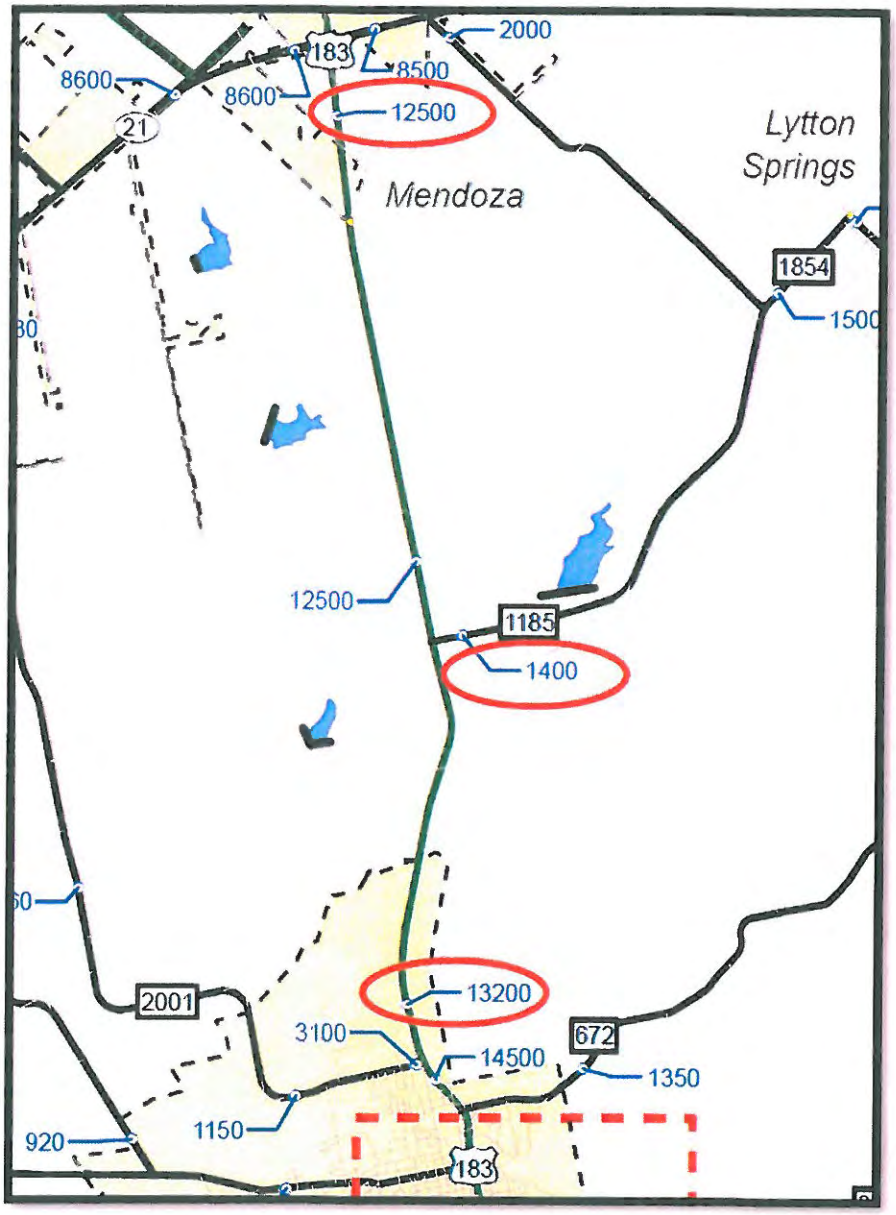


Table 5 presents the historical count data for the site area.

Table 5: TxDOT Historical Count Data

Count Map Year	US 183 north of FM 2001	US 183 south of SH 21	FM 1185 east of US 183
2002	13,600	12,300	1,450
2003	13,000	11,700	1,350
2004	13,500	12,000	1,500
2005	14,580	11,290	1,400
2006	12,600	12,300	1,300
2007	13,800	12,400	1,450
2008	12,600	12,300	1,300
2009	13,000	12,200	1,300
2010	14,700	13,500	1,700
2011*	13,200	12,500	1,400

Source: TxDOT Austin District Traffic Count Maps

* TxDOT's 2011 count map shows 12,500 vpd at a new count location on US 183 north of FM 1185

Based on the average annual daily traffic volumes shown in Table 5, traffic volumes in the study area are relatively stable. The traffic volumes fluctuate upwards and downwards over the 10 year period and do not appear to show any consistent trend.

Background Traffic Volumes (2015 / 2020)

The TxDOT Statewide Planning map has a 2010 and 2030 daily traffic volume listed for US 183 north of FM 1185 in the vicinity of the site. The 2010 volume shown is 14,100 vehicles per day and the 2030 volume shown is 19,740. An annual average growth rate of 1.7 percent can be calculated from these two data points.

The existing turning movement volumes collected and shown in Figure 6 were grown annually by 1.7 percent to arrive at background traffic volumes for the years 2015 and 2020. These background volumes are shown in **Figure 8** and **Figure 9**.

Background Traffic Volumes (2064)

The facility is expected to have a site life of 50 years. The 1.7 percent annual growth used to develop the 2015 and 2020 volumes was maintained in order to estimate the 2064 background volume. The projected 2064 traffic volumes are shown in **Figure 10**.

Figure 8. 2015 (Build-out) Background Traffic Volumes

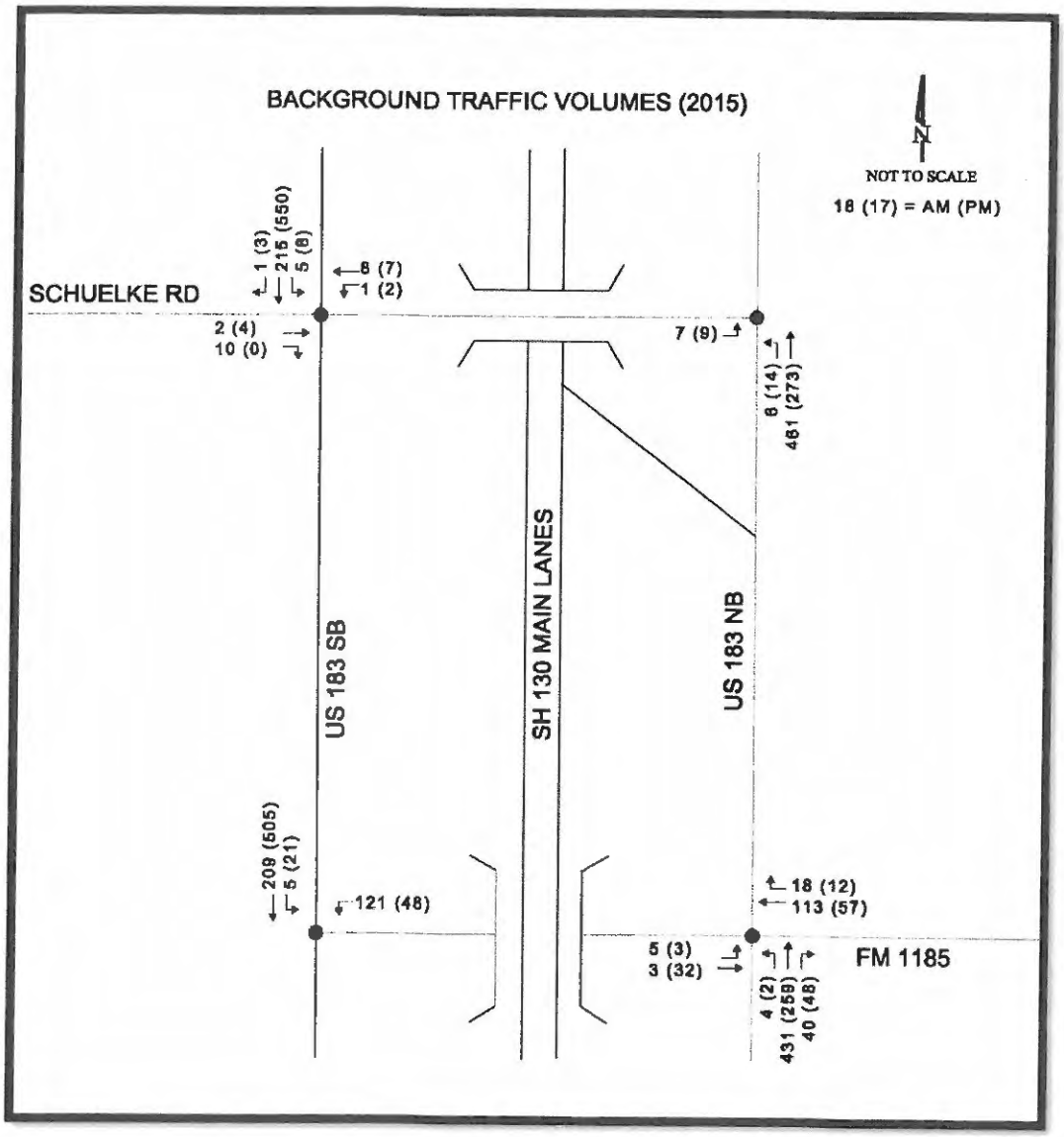


Figure 9. 2020 (Future) Background Traffic Volumes

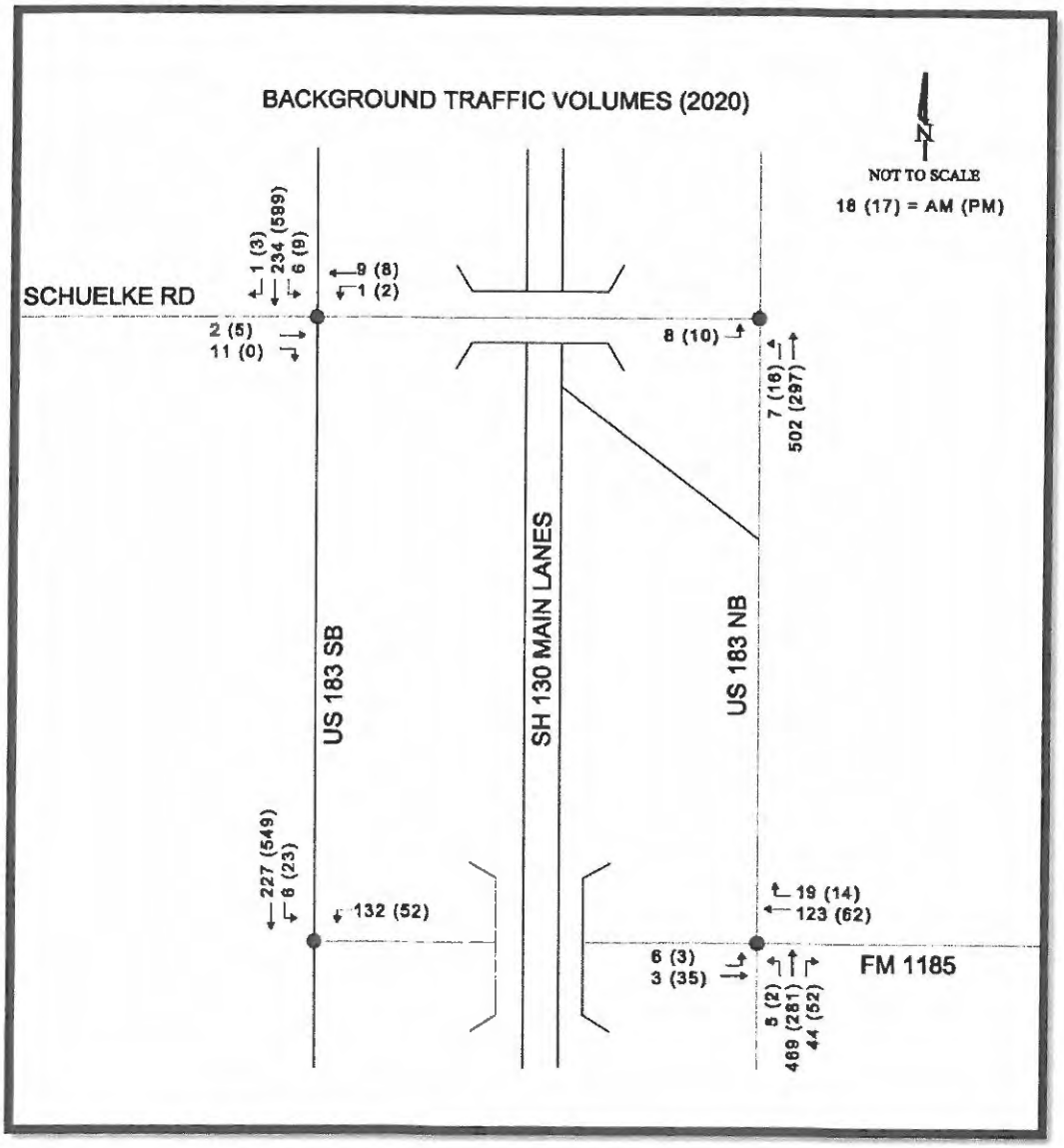
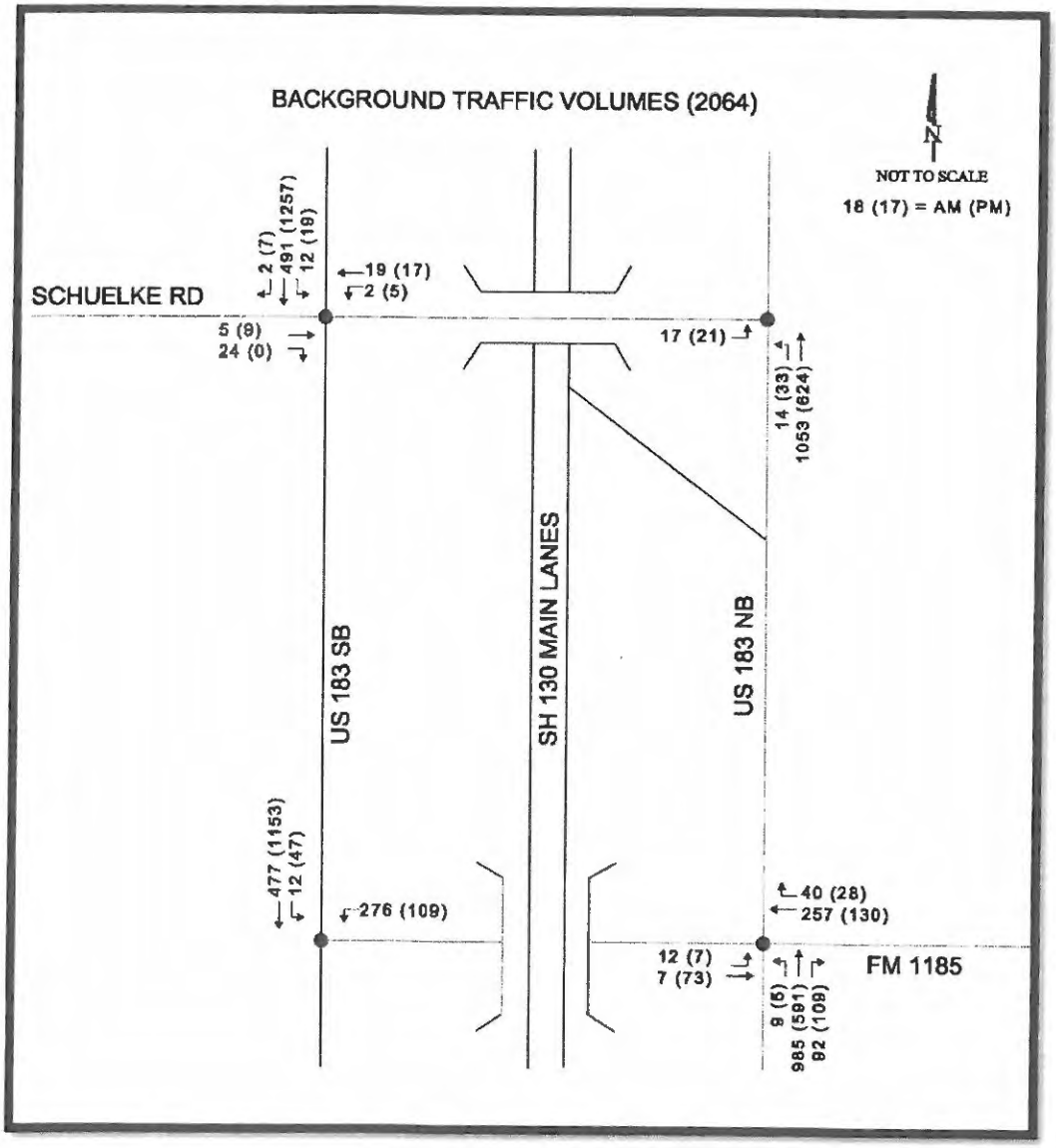


Figure 10. 2064 (Horizon) Background Traffic Volumes



Total Traffic Volumes

The site generated traffic volumes shown in Figures 3, 4, and 5 were added to the background traffic volumes shown in Figures 8, 9, and 10 to obtain the projected total traffic volumes for each of the analysis years –2015 (Build-out), 2020 (Future), and 2063 (Horizon).

The projected 2015 (Build-out) total traffic volumes are shown in **Figure 11.**

The projected 2020 (Future) total traffic volumes are shown in **Figure 12.**

The projected 2064 (Horizon) total traffic volumes are shown in **Figure 13.**

Figure 11. 2015 (Build-out) Total Traffic Volumes (Background + Site)

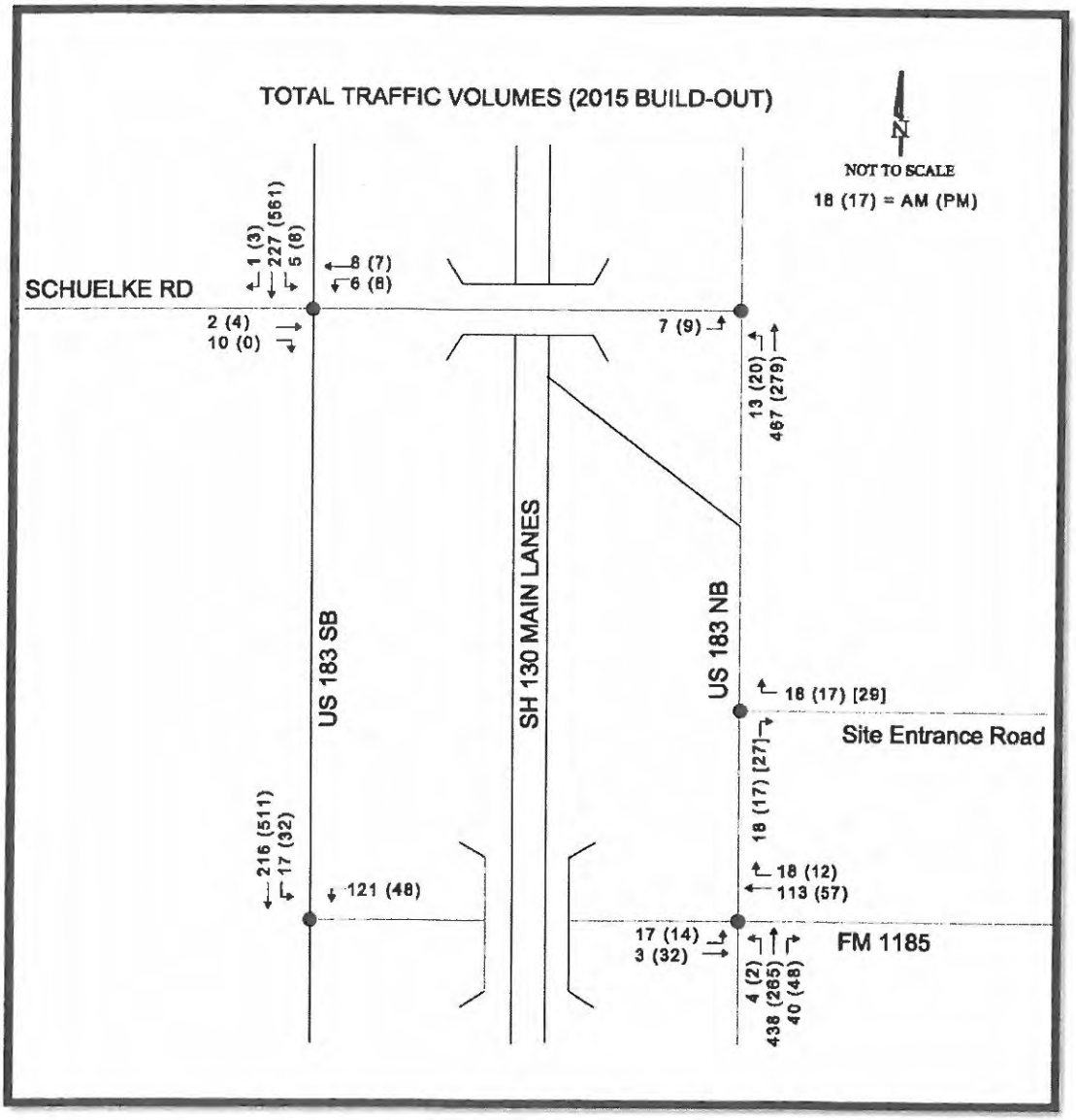


Figure 12. 2020 (Future) Total Traffic Volumes (Background + Site)

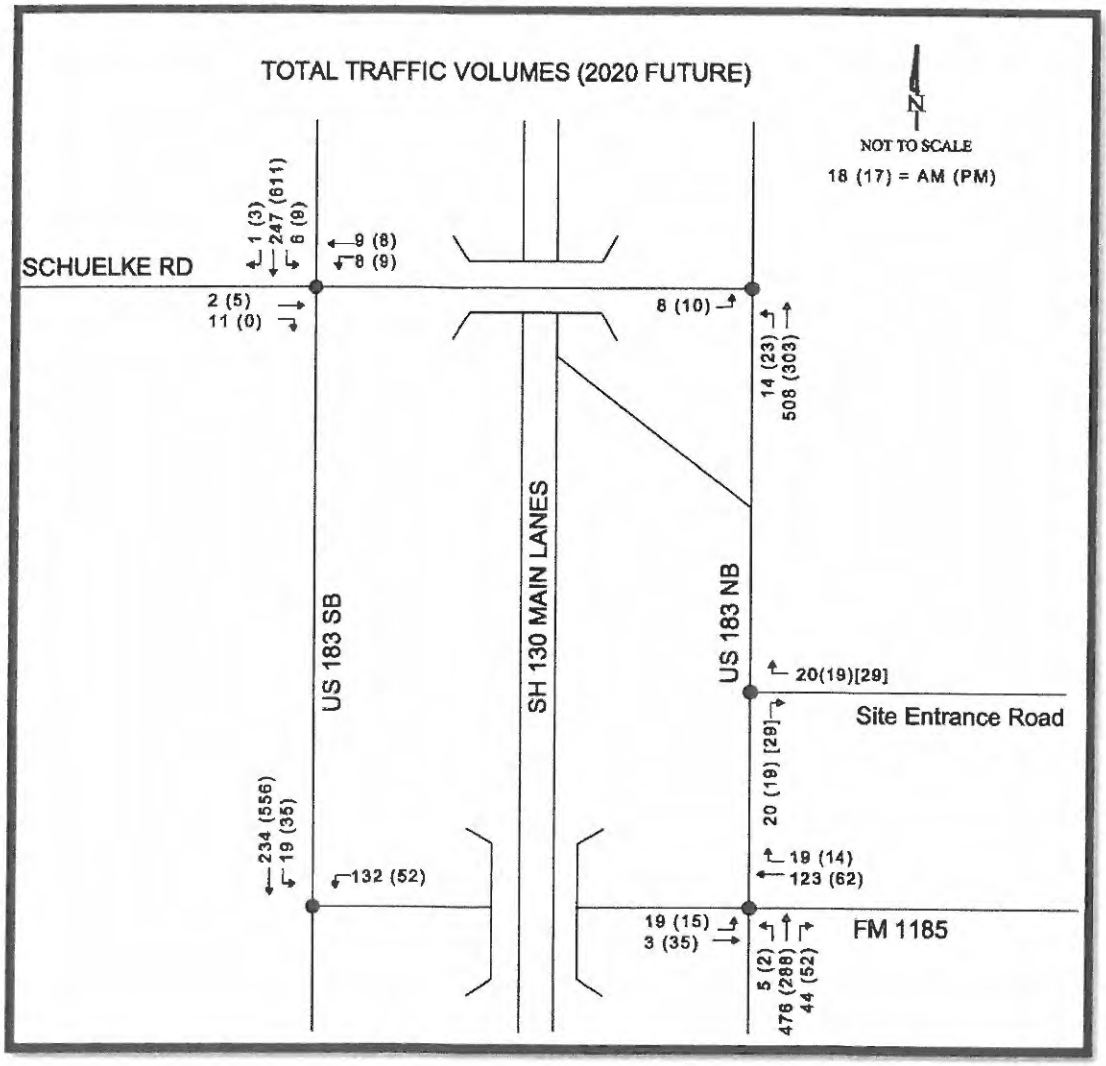
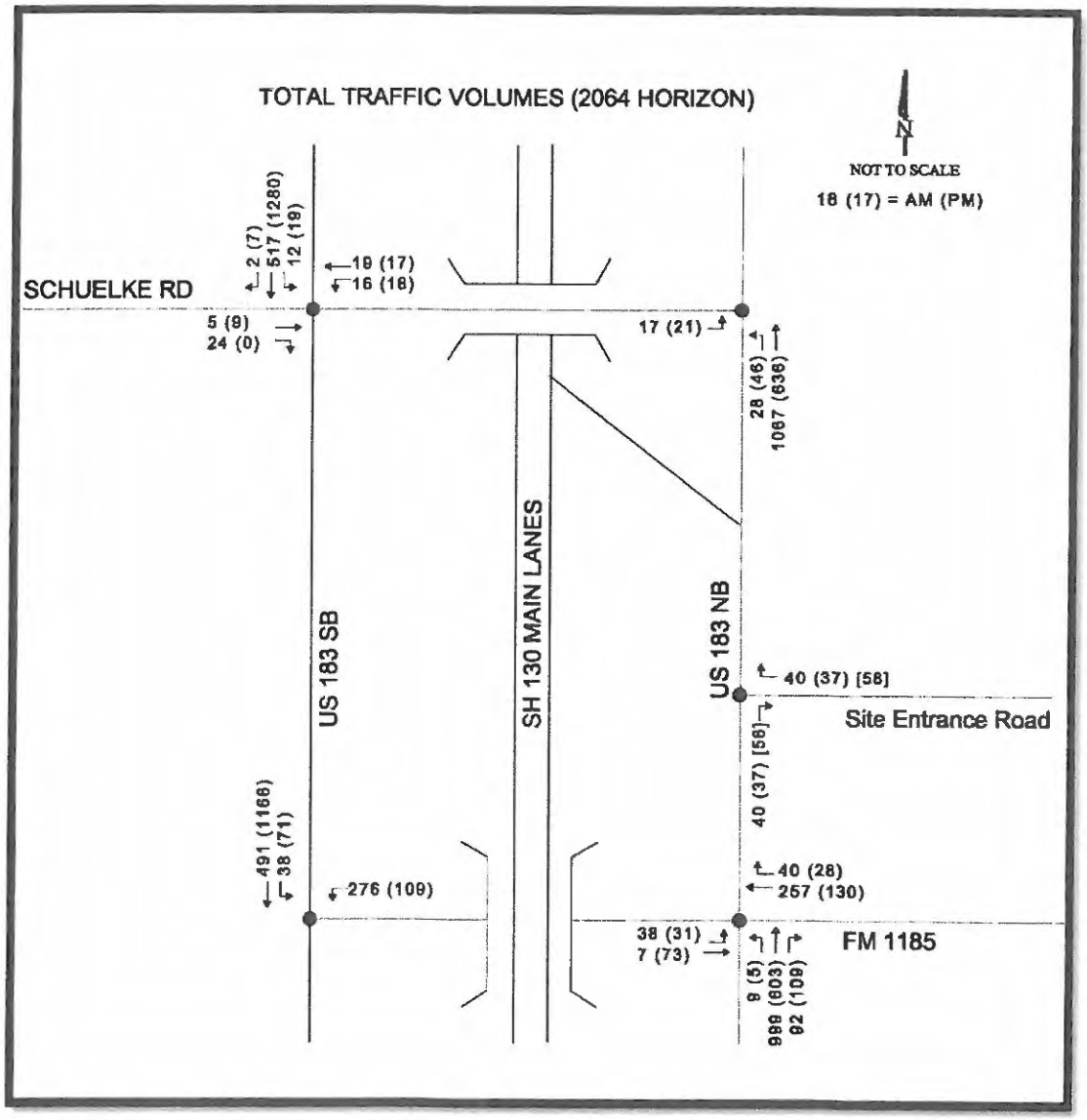


Figure 13. 2064 (Horizon) Total Traffic Volumes (Background + Site)



TRAFFIC ANALYSES

Intersection Capacity Analysis

Intersection capacity analysis was conducted using the 2064 Horizon year total traffic volumes. If an intersection operates acceptably under the 2064 volumes, then it will also perform acceptably under the 2015 and 2020 volumes.

The *Highway Capacity Manual* defines levels of service for automobiles at intersections based on the amount of average delay, in seconds/vehicle, experienced at the intersection. The Level of Service (LOS) of an intersection is a qualitative measure of the capacity and operating conditions and is directly related to vehicle delay.

For unsignalized intersections, the levels of service, as shown in **Table 6**, are defined by average control delay in seconds per vehicle. LOS is given a letter designation from A to F, with LOS A representing shorter delays and LOS F representing longer delays. **Table 7** presents the levels of service thresholds for signalized intersections.

Table 6: Level of Service Criteria for Unsignalized Intersections

Level-of-Service (LOS)	Average Control Delay (seconds/vehicle)
A	≤ 10.0
B	10.1 to 15.0
C	15.1 to 25.0
D	25.1 to 35.0
E	35.1 to 50.0
F	> 50.0

SOURCE: *Highway Capacity Manual,* Transportation Research Board, 2010.

Table 7: Level of Service Criteria for Signalized Intersections

Level-of-Service (LOS)	Average Control Delay (seconds/vehicle)
A	≤ 10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	> 80.0

SOURCE: *Highway Capacity Manual,* Transportation Research Board, 2010.

Unsignalized two-way stop control analysis was performed for the existing intersections along US 183 in the vicinity of the site as well as the proposed site access roadway intersection with US 183 northbound.

- Northbound and Southbound US 183 at FM 1185
- Northbound and Southbound US 183 at Schuelke Road
- Northbound US 183 at Proposed Site Entrance Roadway

Based on the existing 24-hour automated traffic counts (Table 4), the 10:00 AM to 11:00 AM site peak hour is a relatively low volume period for background traffic as compared to the peak AM and PM periods. Turning movement counts were conducted during the AM and PM peak periods only, and are not available for 10:00 AM-11:00 AM. The FM 1185 and Schuelke Road intersections with northbound and southbound US 183 were only analyzed during the heavier volume AM and PM peak hours.

The proposed site driveway to US 183 northbound was analyzed using the background turning movement volumes for the AM and PM peak hours. A site peak hour analysis for the 10:00 AM to 11:00 AM hour was conducted using background traffic grown to 2064 levels.

2064 (Horizon) Traffic Analysis

Table 8 presents the results of the 2064 capacity analysis for the study area intersections. As can be seen in the table, the US 183 northbound intersection at FM 1185 experiences significant delay if operated as an unsignalized intersection in 2064. It is important to note that this intersection presently (2013) has traffic signal infrastructure installed and is operating in the flashing yellow/red mode. It is unlikely that this intersection would remain unsignalized 50 years into the future. A signalized intersection analysis was also conducted for the 2064 total traffic volumes. The analysis indicates that the intersection will operate in an acceptable fashion as a signalized intersection with the predicted traffic volumes.

Table 8: 2064 (Horizon) Total Traffic - Unsignalized Intersection Capacity Analyses Results

US 183 Southbound and FM 1185 (Unsignalized - TWSC)					
		EB	WB	NB	SB[2]
2064 AM Peak		---	18.1 (C)	---	---
2064 PM Peak		---	23.4 (C)	---	---
US 183 Northbound and FM 1185 (Unsignalized - TWSC)					
		EB	WB	NB[2]	SB
2064 AM Peak		> 300 (F)	259.0 (F)	---	---
2064 PM Peak		21.7 (C)	20.0 (C)	---	---
US 183 at FM 1185 (Signalized)[1]					
	Intersection	EB	WB	NB	SB
2064 AM Peak	23.9 (C) NB 15.0 (B) SB	---	31.6 (C)	22.5 (C)	19.0 (B)
2064 PM Peak	19.0 (B) NB 29.7 (C) SB	---	25.9 (C)	19.0 (B)	31.8 (C)
US 183 Northbound and Schuelke Road (Unsignalized - TWSC)					
		EB	WB	NB[2]	SB
2064 AM Peak		14.4 (B)	---	---	---
2064 PM Peak		12.2 (B)	---	---	---
US 183 Southbound and Schuelke Road (Unsignalized - TWSC)					
		EB	WB	NB	SB[2]
2064 AM Peak		11.0 (B)	13.3 (B)	---	---
2064 PM Peak		25.1 (D)	30.8 (D)	---	---

Note: 1 – Only the external diamond approaches shown for signalized analysis.
2 – In the unsignalized intersection analyses, the northbound and southbound through traffic movements on US 183 will experience no delay at intersections or the site driveway and are predicted to operate at levels of service "A" in all analysis years.

Unsignalized intersection capacity analysis was conducted under 2064 traffic conditions for the proposed site access roadway connection to northbound US 183. As can be seen in **Table 9**, acceptable operation at the proposed access point is anticipated for the duration of the site life.

Table 9: 2064 (Horizon) Total Traffic – Site Access Driveway – Unsignalized Intersection Capacity Analyses Results

US 183 and Proposed Site Entrance Road (Unsignalized - TWSC)				
	EB	WB	NB[1]	SB
2064 AM Peak	---	13.7 (B)	---	---
2064 Site Peak	---	10.5 (B)	---	---
2064 PM Peak	---	11.3 (B)	---	---

1 – In the unsignalized intersection analyses, the northbound through traffic movements on US 183 will experience no delay at the site driveway and are predicted to operate at levels of service "A" in all analysis years.

AUXILIARY LANE ANALYSIS

Deceleration Lanes

Access to the proposed driveway will be provided via a proposed driveway connection to US 183. This driveway will be newly constructed and will be approximately 1,450 feet north of FM 1185. The driveway to the site will be approximately 700 feet south of the painted gore for the SH 130 northbound entrance ramp.

Guidelines contained in TxDOT's Access Management Manual for roadways with a posted speed limit greater than 45 mph indicate that right turn deceleration lanes should be considered for right turn volumes greater than 50 vehicles per hour. Based on site traffic data provided by 130 Environmental Park, LLC, the adjusted site traffic (passenger car equivalents) is unlikely to exceed 50 right turns per hour during the peak hour until the facility has been open for approximately 40 years.

Based strictly on volume, the proposed site driveway does not warrant a deceleration lane at this time. However, right turn deceleration lanes should also be considered at locations where high truck volumes, heavy peak flow volumes, or other conditions exist where the safety and efficiency of the facility would be improved by the deceleration lane. Because the driveway will serve mostly trucks, and due to the high speed nature of US 183, Lee Engineering recommends that a right-turn deceleration lane be provided at the proposed site driveway.

Based on the topography of the site and the configuration of the existing property line, Lee Engineering recommends that a deceleration lane with the following dimensions be provided at the site entrance roadway:

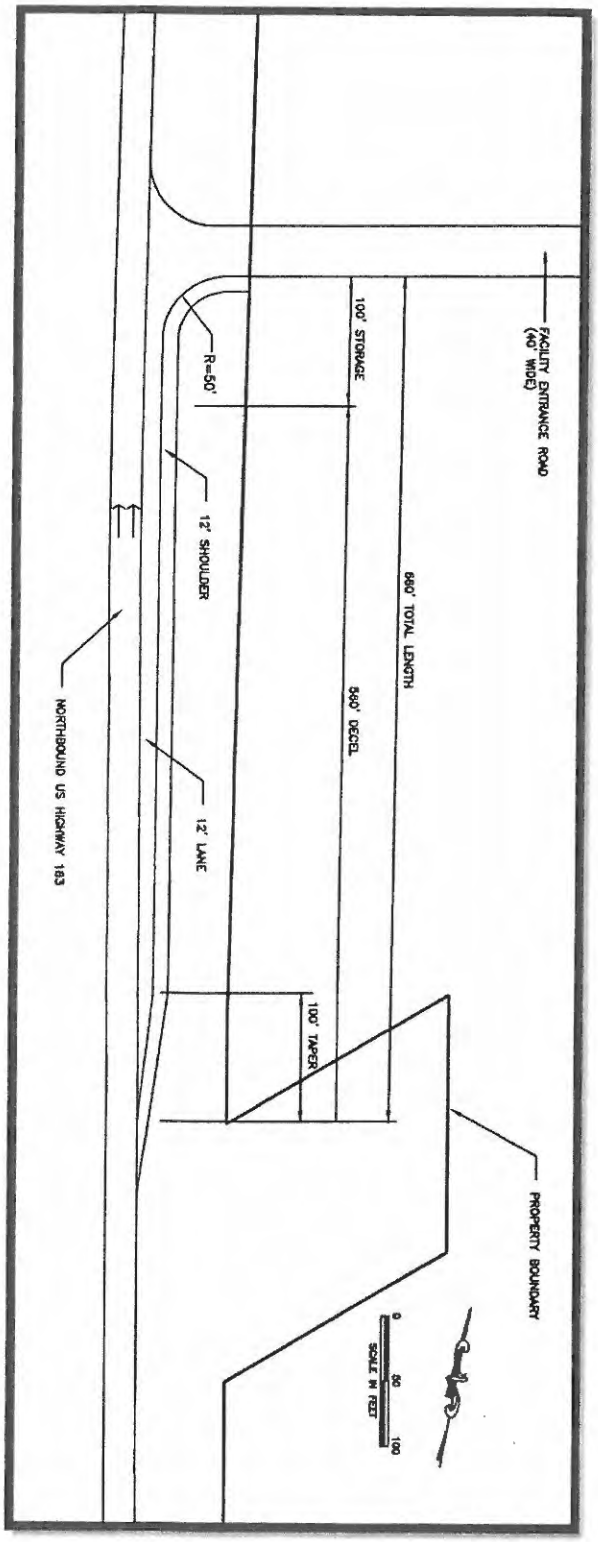
- Total Length: 660 feet (includes taper and storage)
- Taper Length: 100 feet
- Storage Length: 100 feet (includes 50' radius)
- Deceleration Length: 560 feet (includes taper)

Figure 14 presents a graphic depicting the recommended auxiliary lanes for the site access driveway.

Acceleration Lanes

Guidelines in TxDOT's Access Management Manual indicate that right turn acceleration lanes should be considered where right turn egress volumes exceed 200 vehicles per hour. The facility peak hour is predicted to generate 41 exiting vehicles during the 2064 facility peak (58 passenger car equivalents). The roadway profile along US 183 north of the site is sloped downhill slightly away from the proposed driveway location. Due to the low volume nature of the exit movement along with the downhill slope, Lee Engineering does not recommend a northbound acceleration lane be provided at the site.

Figure 14: Deceleration Lane Configuration



INTERSECTION SIGHT DISTANCE

As part of this traffic analysis, the required and available sight distances for motorists accessing the proposed site were evaluated. Guidelines for providing sight distance on roadways and intersections are provided by the American Association of State Highway and Transportation Officials (AASHTO) and published in the 2004 edition of *A Policy on Geometric Design of Highways and Streets*. Text from this document, discussing the minimum (stopping sight) and desirable (intersection) sight distances, is provided below:

> *Stopping sight distance is provided continuously along each highway or street so that drivers have a view of the roadway ahead that is sufficient to allow drivers to stop. The provision of stopping sight distance at all locations along each highway or street, including intersection approaches, is fundamental to intersection operation. (p. 650)*
>
> *If the available sight distance for an entering or crossing vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to anticipate and avoid collisions. However, in some cases, this may require a major-road vehicle to stop or slow to accommodate the maneuver by a minor-road vehicle. To enhance traffic operations, intersection sight distances that exceed stopping sight distances are desirable along the major road. (p.651)*

For the intersection of the site driveway and US 183, the minimum required (based on stopping sight distance) and desirable (based on intersection sight distance) sight distances were estimated using procedures published in AASHTO's *A Policy on Geometric Design of Highways and Streets* (2004). The design vehicle used was a combination truck which has an initial time gap of 10.5 seconds. This time gap is suitable for right turn maneuvers from the site driveway directly into the northbound through lanes of US 183. This time gap results in a calculated desirable intersection sight distance value of approximately 1,003 feet for the combination truck.

A passenger car has an initial time gap of 6.5 seconds. The calculated desirable intersection sight distance for a passenger car is approximately 621 feet.

A field visit to the proposed site driveway location was conducted to evaluate the available intersection sight distance looking left. From the proposed site driveway, there is a clear line of sight extending to the south through the FM 1185 intersection. The FM 1185 intersection is located approximately 1,500 feet south of the driver's eye location on the proposed driveway. As such, adequate sight distance exists for exit movements from the proposed driveway location.

The summary of the sight distance evaluation is presented in **Table 10.**

Table 10: Analysis of Intersection Sight Distance

Major Roadway	US 183	
Posted Speed Limit	65 mph	
Minor Roadway	Site Driveway	
Design Vehicle	Passenger Car	Combination Truck WB 67
Driver's Eye (Observation) Height	3.5'	7.6'
Target Object Height	3.5'	3.5'
MINIMUM Sight Distance (Stopping)	645'	645'
DESIRABLE Sight Distance (Intersection)	621'	1003'
Available Sight Distance to the Left	Exceeds 1,500 feet	
Available Sight Distance to the Right	Not applicable to right turn movement	
Sight Distance Available > MINIMUM		
To the Left	YES	YES
Sight Distance Available > DESIRABLE		
To the Left	YES	YES

The proposed location of the site driveway will provide adequate sight distance to the south for both combination trucks and passenger cars exiting the site.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this study for the 130 Environmental Park, the following conclusions and recommendations are made:

- The 130 Environmental Park is estimated to generate approximately 322 trips on a daily basis during 2015 (Build-out), 344 per day during 2020 (Future), and 584 per day during 2063 (Horizon). **These trips include traffic generated by both the solid waste disposal facility and the waste transfer station.**

- Intersection capacity analysis results for US 183 indicate that the roadway adjacent to 130 Environmental Park is predicted to operate at acceptable levels of service under 2064 total traffic conditions. **US 183 has adequate capacity available to serve the traffic generated by the 130 Environmental Park.** 130 Environmental Park traffic is predicted to have minimal impact to US 183 traffic flow.

- **Table 11** presents a summary of the 130 Environmental Park generated traffic volumes as a percentage of the total traffic volumes on US 183 under 2015, 2020, and 2063 traffic conditions. As shown, the 130 Environmental Park will contribute a minimal amount of traffic to US 183 in the area.

Table 11: Site Traffic as a Percentage of Total Traffic

Analysis Year	Projected Daily Volume US 183 north of FM 2001	Daily Site Traffic (Entry+Exit)	Site Traffic Percentage of Total Traffic
2015 (Build-out)	13,650	358	2.6%
2020 (Future)	14,850	388	2.6%
2064 (Horizon)	31,175	772	2.5%

- The site driveway connection US 183 should be constructed with a northbound right turn deceleration lane.

- No other roadway improvements are necessary to accommodate site traffic. The existing roadway infrastructure has adequate capacity to accommodate the site generated traffic.

- US 183 will be adequate to handle the predicted volumes of site traffic throughout the life of the 130 Environmental Park facility.