FEHR & PEERS

MEMORANDUM

Date: June 27, 2012

To: Marion Pavan, City of Pleasanton
Todd Paradis, Safeway

From: Sam Tabibnia and Rob Rees

Re: Queuing Analysis for the Proposed Safeway Gas Station in Pleasanton WC12-2937

This memorandum summarizes the queuing analysis Fehr & Peers conducted for the proposed gas station at the existing Safeway Store in Gateway Shopping Center on Bernal Avenue in Pleasanton. The proposed project would consist of a gas station with 18 fueling positions and queuing space for 18 additional vehicles. Our analysis is based on our observations and queuing data collected at the existing Safeway gas stations in Dublin and Livermore.

The conclusions of our analysis followed by our analysis assumptions and methodology are provided below.

CONCLUSIONS

The analysis results are summarized below:

- The maximum weekday PM peak hour demand is estimated to be 239 vehicles per hour.
- The maximum queue during typical weekday operations is estimated at 15 vehicles, less than the 18-vehicle queuing space provided in the gas station.
- Provide a fuel ambassador on-site during peak demand periods to direct traffic.
- On-site fuel deliveries may disrupt normal site operations and temporarily reduce the on-site queuing capacity to 15 spaces. Therefore, monitor operations after the gas station has been open to evaluate potential disruptions and identify potential scheduling or operational measures needed to improve gas station access and circulation.
- Fehr & Peers reviewed the project site plan and determined that it would accommodate access and circulation for both passenger vehicles and fuel delivery trucks.

DATA COLLECTION

Fehr & Peers collected queuing data at the existing Safeway gas stations in Dublin and Livermore on May 23 and May 22, 2012, respectively. **Table 1** compares these two gas stations with the proposed gas station on Bernal Avenue in Pleasanton based on a project site plan shown on **Figure 1**.

TABLE 1
PROJECT SITE COMPARISON

Metric	Dublin	Livermore	Pleasanton
Number of Fueling Positions	12	16	18
Setting	As part of stand-alone Safeway	In large shopping center with Safeway anchor	In large shopping center with Safeway anchor
Location	Dublin Boulevard; a 6-lane arterial	First Street; a 6-lane arterial	Bernal Avenue; a 4 to 6-lane arterial
PM peak hour traffic Volume on Adjacent Street	2,700 vehicles [1]	3,000 vehicles [2]	3,800 vehicles [3]
Distance from Freeway	0.4 miles	0.7 miles	0.3 miles
Nearest Gas Station	About 0.2 miles	About 0.2 miles	About 0.1 miles
Other gas stations within one-half mile	3	4	1
Convenience Kiosk	400 square feet	400 square feet	650 square feet
Vehicle Queuing Space			
Within gas station	8 vehicles	2 vehicles	18 vehicles
Within shopping center	23 vehicles	15 vehicles	34 vehicles

1. PM peak hour traffic volume on Dublin Boulevard just east of Amador Plaza Road. Source: *Downtown Dublin Specific Plan Draft EIR*, September 2010.
2. PM peak hour traffic volumes on First Street south of Las Positas Road based on traffic counts collected in 2008.
3. PM peak Hour traffic on Bernal Avenue, east of I-680. Source: *Pleasanton Gateway Transportation Impact Study*, June 2009.

Source: Fehr & Peers, 2012.

Operations at each gas station are described below:

- The Dublin gas station provides 12 fueling positions in four rows and each row of fueling positions provides two striped queuing spaces. Thus, the gas station has a total queuing space of eight vehicles before queues block circulation aisles within the shopping center. **Figure 2** shows an aerial view of the Dublin gas station.
- The Livermore site provides 16 fueling positions in eight rows; however it does not provide striped queuing space for each row of fueling positions. All vehicles queue in the same lane and wait for an available fueling position. As observed, typically two vehicles could queue on-site before queues blocked shopping center circulation aisles. **Figure 3** shows an aerial view of the Livermore gas station.

For both gas stations, all vehicles enter from the same direction and the one-way circulation within the gas station is enforced by signage and striping. In addition, fuel ambassadors were present at both gas stations during peak activity periods to guide motorists to the appropriate queues and fueling positions. Both gas stations also provide convenience kiosks. During our

peak period observations at both sites, we did not observe any customers who only visited the kiosks without purchasing fuel.

Table 2 summarizes the data collected by Fehr & Peers at the existing Dublin and Livermore gas stations. Data at both gas stations was collected from 4:00 PM to 6:00 PM which corresponds to the typical peak activity period on weekdays.

TABLE 2
DATA COLLECTION SUMMARY

Metric	Dublin[1]	Livermore[2]
PM peak hour demand	159 vehicles	147 vehicles
Service time (minutes :seconds) [3]	4:00	5:10
Fuel ambassador	Present during peak demand periods	Present during peak demand periods
Peak hour observed queues (all fueling positions are occupied):		
Average	9 vehicles	3 vehicles
Maximum	15 vehicles	8 vehicles
ITE predicated demand: [4]		
Per fueling position	83 vehicles	111 vehicles
Per PM peak hour adjacent street traffic	68 vehicles	75 vehicles

1. Based on data collected on May 23, 2012 from 4:00 PM to 6:00 PM at the existing Safeway Gas Station on Dublin Boulevard.
2. Based on data collected on May 22, 2012 from 4:00 PM to 6:00 PM at the existing Safeway Gas Station on First Street in Livermore.
3. Service time is defined as time vehicles spend at a fueling pump.
4. Based on average rate for gasoline/service station (Land Use 944) published by ITE in *Trip Generation, 8th Edition*.

Source: Fehr & Peers, 2012.

As shown in the table, the Dublin gas station, which provides 25 percent fewer fueling positions than the Livermore gas station, has a ten percent higher trip generation. Since the Dublin gas station provides fewer fueling positions, it also results in longer queues. In addition, as the amount of activity in both gas stations increased, the service time (i.e., the time vehicles spend at the fuel pump) decreased. Based on our observations, the peak hour queues in both gas stations regularly exceeded the queuing space provided within the gas station. While the queuing did at times impact on-site circulation for the shopping-related trips, at no time did the queue impact the adjacent arterials.

Table 2 also compares the observed PM peak hour demand at the Dublin and Livermore gas stations to the peak hour demand predicted by trip generation data published by Institute of Transportation Engineers' (ITE) *Trip Generation, 8th Edition*. The observed demand at both gas stations is higher than the demand predicted by ITE. The ITE data underestimates the trip

generation at the two surveyed sites. This is because gas station trip generation may be more sensitive to other variables, such as price of fuel, which are not included as variables in ITE *Trip Generation*. The surveyed Safeway gas stations generally priced gas lower than their competitors in the area and is likely the reason that traffic demand at the surveyed sites are higher than ITE-calculated demand.

PLEASANTON GAS STATION – PEAK HOUR DEMAND AND QUEUES

The proposed Pleasanton gas station would provide 18 fueling positions in six rows. Each row would provide striped queuing space for three vehicles for a total queuing space of 18 vehicles. In comparison, the proposed Pleasanton site would provide more fueling positions and more queuing space than either the Dublin or Livermore gas stations.

Peak Hour Demand

Table 3 summarizes the estimated vehicle demand at the proposed Pleasanton gas station during the weekday PM peak hour based on published ITE data and data collected at the surveyed Dublin and Livermore sites.

TABLE 3
PLEASANTON SAFEWAY GAS STATION INBOUND DEMAND ESTIMATES

Metric	ITE-Based Inbound Demand	Survey-Based Inbound Demand		
		Dublin	Livermore	Average
Number of Fueling Positions (18)	125 [1]	239 [2]	165 [3]	202
PM peak hour traffic Volume on Adjacent Street (3,800 vph)	95 [4]	224 [5]	186 [6]	205

1. Based on average rate per number of fueling positions for gasoline/service station (Land Use 944) published by ITE in *Trip Generation, 8th Edition* (18 * 13.87 * 50%).
2. Based on observed rate of demand per number of fueling positions at the existing Dublin site (18 * [159 / 12]).
3. Based on observed rate of demand per number of fueling positions at the existing Livermore site (18 * [147 / 16]).
4. Based on average rate per peak hour of adjacent street traffic (Land Use 944) published by ITE in *Trip Generation, 8th Edition* (3,800 * 0.05 * 50%).
5. Based on observed rate of demand per PM peak hour of traffic volume on adjacent street at the existing Dublin site (3,800 * [159 / 2,700]).
6. Based on observed rate of demand per PM peak hour of traffic volume on adjacent street at the existing Dublin site (3,800 * [147 / 3,000]).

Source: Fehr & Peers, 2012.

The ITE-based method uses number of fueling positions and the PM peak hour traffic volume on the adjacent street as independent variables and the average rates published in ITE's *Trip Generation, 8th Edition* to estimate the peak hour demand at the proposed Pleasanton gas station. Using the ITE-based data, vehicle demand at the proposed site would be 125 or 95

vehicles per hour, depending on the independent variable. As discussed in the previous section, it is expected that ITE data underestimate demand at Safeway-operated gas stations.

The survey-based method uses observations at the existing Dublin and Livermore sites to develop demand rates per number of fueling positions and PM peak hour traffic volume on the adjacent street. These average rates are then used to estimate the peak hour demand at the proposed Pleasanton gas station. Using the survey-based data, vehicle demand at the proposed site would range between 165 and 239 vehicles per hour.

Based on the different methods and independent variables described above, the survey-based demand calculations are greater than ITE. The highest peak hour vehicle demand is estimated to be 239 vehicles per hour. This demand is based on the observed demand per fueling position at the Dublin site.

Maximum Queues

As shown in **Table 3**, the most conservative estimated demand is about 239 vehicles per hour. In comparison to the Dublin gas station (which has the higher trip generation of the two surveyed sites), the Pleasanton gas station would provide 50 percent more fueling positions, therefore it would also serve about 50 percent more vehicles during the peak hour. Since both demand and service rate would be about 50 percent higher, the maximum queue at Pleasanton would be about the same as the observed maximum queue at Dublin, or about 15 vehicles.

Considering that up to 18 vehicles can queue within the site, it is expected that the maximum queue during typical weekday operations would be accommodated within the site. It is very unlikely that queues would spill into the adjacent circulation aisles and interfere with the overall circulation in the Gateway Shopping Center during the typical weekday operations.

PLEASANTON GAS STATION – SITE ANALYSIS

Typical Operations

The proposed gas station would provide 18 fueling positions in six rows of three fueling positions. Circulation within the proposed gas station would be one-way with all vehicles entering the gas station from the east, circulating counterclockwise, and exiting to the west. If all fueling positions are occupied, vehicles would enter the gas station and queue in one of the six marked queuing lanes and wait for a fueling position to become available.

The gas station provides adequate space for vehicles to maneuver and access an available fueling position. The fueling pumps in the same row are spaced 25 feet from each other. This is the same or larger spacing as typical on-street parallel parking spaces. Thus, if only a center fueling position is available, vehicles can access it similar to parallel parking spaces. In addition, the drive aisle between fueling rows would be about 17 feet wide with stopped vehicles on both sides,

which provides adequate space for queued vehicles to maneuver from the queue to an available fueling position and for vehicles to leave a fueling position.

Based on our observations, a fuel ambassador was present at both Dublin and Livermore sites during the peak activity periods. It is our understanding that similar to other Safeway gas stations, Safeway will use fuel ambassadors to facilitate circulation and direct traffic within this site when needed.

Fuel Delivery

The fuel storage tanks for the Pleasanton gas station would be located at the northeast corner of the site. Fuel deliveries are typically conducted throughout the day as needed depending on the amount of fuel in the storage tanks. Safeway typically provides two or three fuel deliveries on a weekday. Fuel deliveries are typically during non-peak periods such as nights and early mornings; however, they may be necessary at any time of day depending on the amount of fuel in the storage tanks. It is unknown how often fuel deliveries could occur during peak activity periods and how they could disrupt gas station operations.

Figure 4 shows circulation of a fuel truck within the site. Fuel trucks would enter the site similar to other vehicles from the east and park in the northeast corner of the site while fuel is being delivered. They would leave the site through the drive aisle between the fueling pumps and the convenience kiosk.

Figure 5 shows the number of vehicles that can queue during fuel delivery, which is expected to last about thirty minutes. During this period, the number of vehicles that queue within the site would be reduced by about three spaces to 15 spaces, same as the maximum estimated queue.

During peak activity periods, queued vehicles may block the fuel storage tanks. Thus, fuel trucks may need to wait for queues to decrease in order to access the fuel storage tanks. During this short period while fuel trucks maneuver to access the storage tanks, vehicles may queue in the circulation aisle outside the gas station and interfere with circulation within the Gateway Shopping Center. But, the impacts are not expected to impact adjacent roadway operations.

At this time, it is not known how often fuel deliveries may be needed during peak activity periods and if they would conflict with the gas station operations. Although potential conflicts are expected to be minimal, fuel deliveries during peak activity periods may need to be monitored after the gas station has been open for six months to determine if they disrupt on-site operations and if any measures would be needed to improve gas station access and circulation.

Convenience Kiosk and Other Amenities

The proposed Pleasanton gas station would include a 650 square-foot convenience retail kiosk on the north end of the site. This kiosk would be larger than the existing 400 square-foot kiosks at the surveyed Dublin and Livermore gas stations. Based on our observations at the Dublin and

Livermore sites, all kiosk customers were also gas station customers (i.e., we did not observe any vehicles who only visited the convenience kiosk without purchasing any fuel). Thus, number of vehicles driving to the Pleasanton site to only visit the convenience kiosk is expected to be minimal. The proposed Pleasanton gas station would provide three parking spaces adjacent to the convenience kiosk that can be used for customers who would not purchase fuel and would only visit the convenience kiosk.

The proposed Pleasanton gas station would also provide one air/water station at the east most parking space on the north side of the site. Based on our observations at the Dublin and Livermore gas stations, only one customer was observed using the air/water station. Thus, number of vehicles using the air/water station at the proposed Pleasanton site is expected to be minimal. Since the air/water station is at a parking space, vehicles using air/water would park in the parking space and not interfere with site circulation. The site would also provide adequate space for one vehicle to wait for the air/water station without interfering with gas station queues. Considering that minimal usage of the air/water station is expected, the air/water station would not interfere with the overall gas station circulation.

The few vehicles that may want to access the kiosk and/or the air/water station when gas station queues are at capacity may need to wait for the queues to clear in order to access the kiosk or the air/water station. Considering the minimal demand for the kiosk and/or the air/water station, this is not expected to occur regularly.

Please contact us with questions or comments.

Attachments:

Figure 1 – Pleasanton Safeway Gas Station Site Plan

Figure 2 – Dublin Safeway Gas Station Aerial

Figure 3 – Livermore Safeway Gas Station Aerial

Figure 4 – Fuel Truck Circulation

Figure 5 – Queuing During Fuel Delivery

Figure 1 – Pleasanton Safeway Gas Station Site Plan

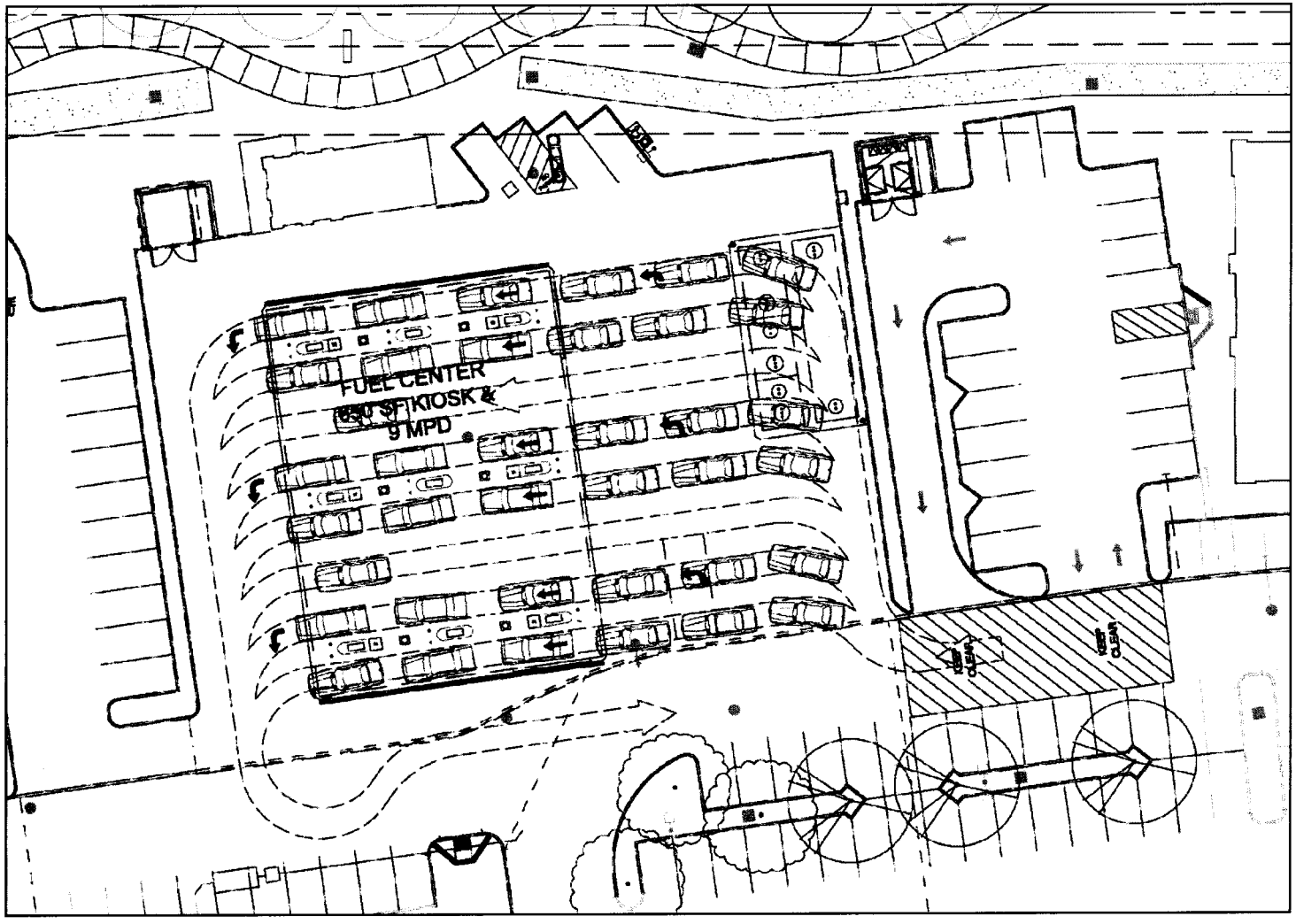

Figure 2 – Dublin Safeway Gas Station Aerial

Figure 3 – Livermore Safeway Gas Station Aerial

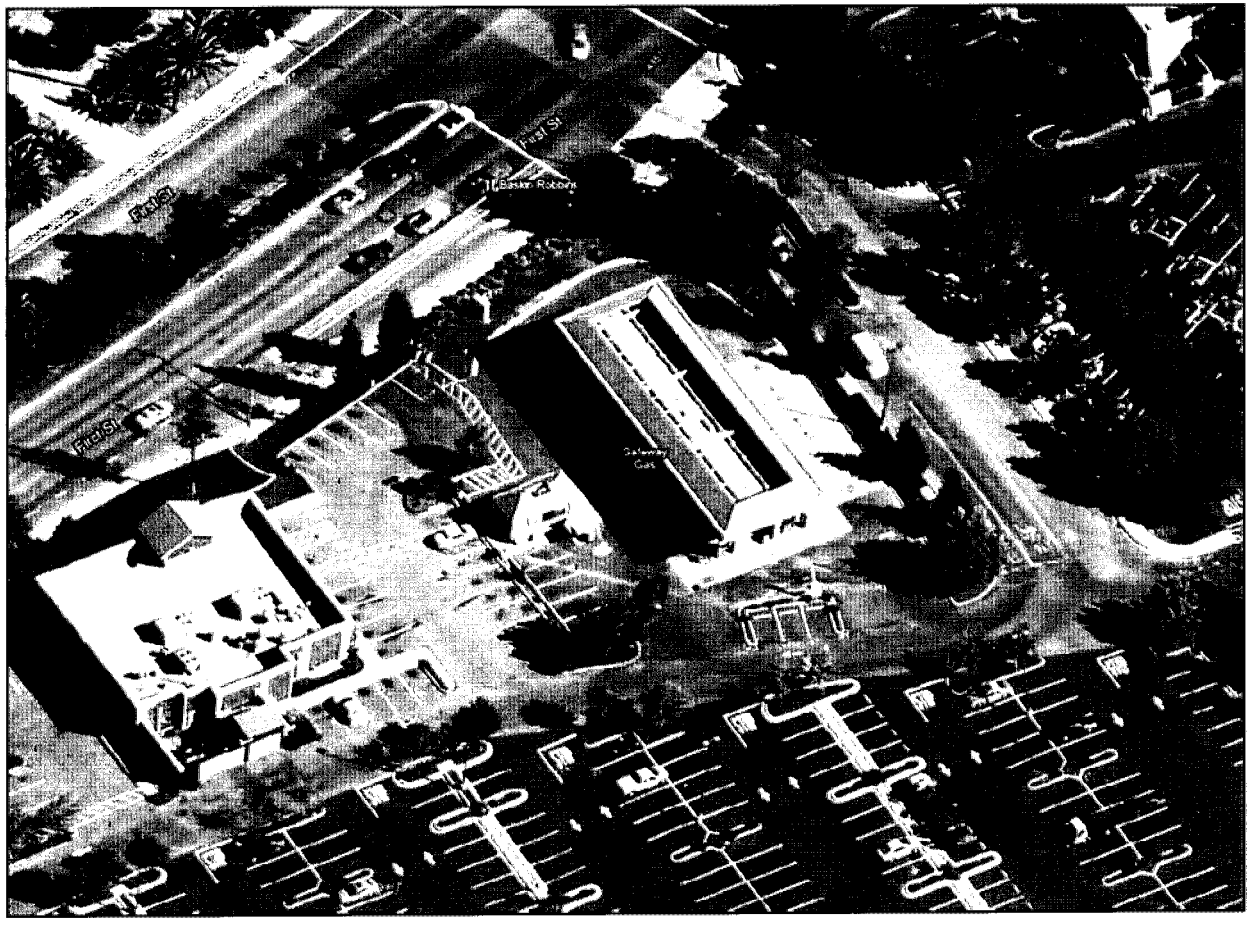

Figure 4 – Fuel Truck Circulation

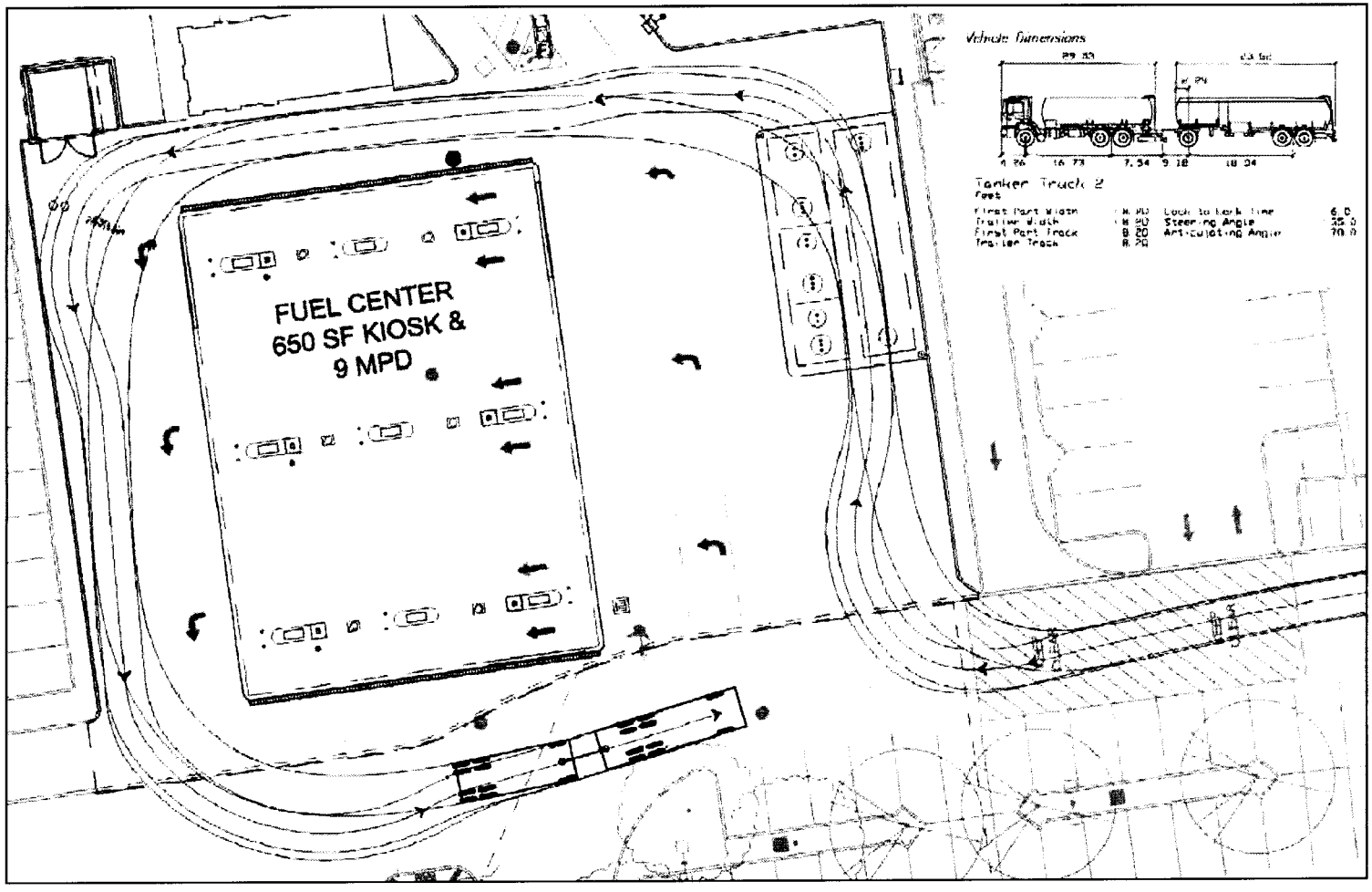

Figure 5 – Queuing During Fuel Delivery