ROBERT BERNSTEIN, P.E.
Consulting Transportation Engineer/Planner

March 26, 2010

Glenrose Community Assn
c/o Mr. Peter Ice
3220 S Eastern Ave
Spokane, WA 99223

SUBJECT: Analysis and Evaluation of Traffic Impacts of Proposed Spokane South Little League Playing Fields in Spokane County, WA

Dear Mr. Ice:

Per your request, I have prepared an analysis of the expected traffic impacts of the Spokane South Little League Playing Fields proposed for the property located on the east side of Glenrose Road south of 37th Avenue in Spokane County. The reason the Glenrose Community Association has found it necessary to commission and fund this traffic analysis – which typically would be the responsibility of the Applicant and the County – is that the County approval process for this proposed development has no provision for any further public review and input. My full traffic analysis is attached, and its findings and recommendations are summarized below. The traffic analysis addresses the issues I raised in my December 9, 2009, letter, which also is attached for reference.

Findings and Recommendations

Findings

- Traffic speeds on Glenrose Road are excessive, significantly increasing the hazards associated with the inherent conflicts between through traffic and site traffic at the site accesses and between through traffic and turning traffic at the 37th/Glenrose intersection, and increasing the necessary sight distances at the site driveway on Glenrose.
- Traffic generated by the SSLL fields will create significant congestion and delay for eastbound and westbound traffic on 37th Avenue at the Glenrose intersection stop sign during periods of peak site use and typical use, and prior to full site development.
- Traffic exiting the site onto 37th will enter the 37th/Glenrose intersection on a stop-controlled approach will have a disproportionately greater impact on congestion and delay than will traffic exiting onto Glenrose.
- Delays on westbound 37th at the Glenrose stop sign will encourage site traffic exiting onto 37th to divert to local neighborhood streets (e.g., Fancher) to avoid the intersection..
- At times of peak site usage there is significant potential for congestion in on-site parking lots that can back up cars onto 37th and Glenrose and block site accesses, causing queuing on 37th and Glenrose themselves. These access blockages and queue spillbacks cause significant safety hazards for area traffic and for site traffic.

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- Congestion in the site parking lots and on internal site circulation drives – during typical and peak use periods –will encourage site visitors to park off-site in order to avoid on-site congestion and delay. On the public roads around the site high traffic speeds, the lack of adequate shoulders for on-street parking, the lack of walkable shoulders or sidewalks, and the lack of safe pedestrian crossings make on-street parking a serious hazard for moving traffic, for parked vehicles, and particularly for site visitors walking to/from their vehicles.
- Congestion in the site parking lots and circulation drives – during typical and peak use periods –will also encourage drop-offs of site users to be made off-site. As with off-site on-street parking, the high traffic speeds, the lack of walkable shoulders or sidewalks, and the lack of safe pedestrian crossings on the streets in the site vicinity, make off-site drop-offs a serious hazard for moving traffic, but more importantly, for those being dropped off, many/most of whom will be Little-Leaguers, soccer players, and other children.

Recommendations

1. In order to minimize the impact of site access/egress traffic operations on traffic operations at the 37th/Glenrose intersection, site accesses should be located as far as possible from the intersection.

2. In order to minimize on-site congestion and prevent it from impacting traffic safety on adjacent streets:
   2.1. Provide two accesses – one on 37th and one on Glenrose – that are both in operation on "opening day." (Even if the proposed development is phased, there is need for two accesses from the beginning, as the site cannot function safely with a single access in early phases.)
   2.2. At all entrances, provide unimpeded parking lot entry throats of adequate length to prevent entrance blockage and queue spillback onto public streets.
   2.3. Consolidate all parking in one area with efficient internal circulation.

3. In order to prevent site access traffic from queuing in the southbound travel lane of Glenrose Road:
   3.1. Construct a left turn lane in Glenrose Road for southbound site access traffic.
   3.2. In order to ensure that site entry queues never form in the southbound Glenrose travel lane, and to provide adequate sight distance for southbound Glenrose traffic approaching the site access and any queues formed there, the site access left turn lane and/or a center median should extend back at least to the roadway crest on Glenrose south of 37th, and preferably all the way to 37th.

4. Because entering sight distance for left-turning traffic exiting the site onto southbound Glenrose is inadequate (due to high speed of Glenrose traffic and the proximity of the hillcrest on Glenrose south of 37th), a left turn acceleration lane is needed south of the site access opposite the needed left turn lane for entering traffic..

5. In order to minimize the impact of site egress traffic on the Glenrose/37th intersection, and to reduce or eliminate the use of neighborhood streets to avoid the intersection, all site egress should be onto Glenrose Road (i.e., the site access on 37th should be for entering traffic only).

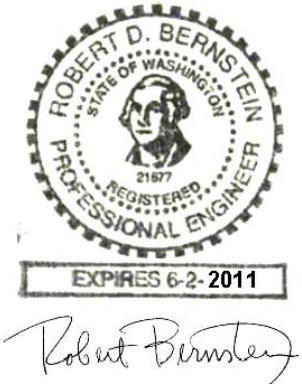
6. In order to discourage/prevent off-site parking and off-site drop-offs:
   6.1. Adopt and post no parking zones along both sides of 37th and Glenrose in the site vicinity.
   6.2. Fence the site in a manner that limits pedestrian access to the locations where vehicular access is provided.
   6.3. Provide a drop-off area on-site that has convenient vehicular and pedestrian access and egress.

7. In order safely accommodate site generated traffic at the 37th/Glenrose intersection, several improvements are needed, including (i) the provision of left turn lanes on all approaches (to allow turns from the uncontrolled Glenrose approaches to made outside of the travel lanes, and to reduce the delays on the stop-controlled 37th approaches), and (ii) the installation of a flashing beacon to increase the visibility of the intersection and its control for approaching motorists.

If you have any questions or if you need additional information, please contact me.

Sincerely,

Robert Bernstein, P.E.



attachments:
- SSLL Playing Fields Traffic Analysis
- *Review of Traffic Issues Associated with Proposed Spokane South Little League Playing Fields in Spokane County, WA*, Robert Bernstein, P.E., 12/9/09

Summary of Qualifications. I have Bachelor's and Master's degrees in Civil Engineering (from Georgia Tech and Northwestern University, respectively), and I am a registered professional engineer in Oregon, Washington, California, Idaho, Georgia, and New Jersey. I have over 30 years of transportation planning and traffic engineering experience, including five years with the City of Portland and seven years with the Puget Sound Council of Governments. In these positions and as a private consultant, I have prepared the transportation element for a dozen city and county comprehensive plans and numerous downtown plans, and I have conducted a wide variety of regional and subregional travel demand forecasting studies, traffic operations and safety analyses, and neighborhood traffic management studies. In addition, I have provided on-call development review services for several cities in Oregon, Washington, and California, and over the last 25 years I have provided expert assistance on development-related traffic issues to over 100 community groups (including nine in the Spokane area).

Proposed South Spokane Little League Playing Fields Traffic Analysis

The analyses prepared to date for the proposed South Spokane Little League Playing Fields development are incomplete and contain inaccurate information. As a result, the proposed development's actual impacts on traffic and public safety have not been addressed. Specifically, there are significant traffic safety impacts and significant capacity and operations impacts that have not been acknowledged, analyzed, or addressed, and site trip generation has been significantly underestimated. In order to provide the necessary information and analyses, and to identify needed roadway improvements, traffic control improvements, and site design features, this report comprises the following sections:

- Traffic Generation and Distribution
- Traffic Speeds and Sight Distance
- Traffic Operations (intersection capacity, delay, and level of service)
- Findings and Recommendations

Traffic Generation and Distribution

The traffic impact analysis for any development must address conditions during typical peak periods. For office and residential developments, whose use is "regular" (i.e., pretty much the same every [week]day), the peak periods that need to be analyzed are clear: peak traffic generation of such developments occurs on weekday afternoons, usually concurrently with the street system's peak volume period. Use of the proposed playing fields development, however, is "episodic" (i.e., event-based), and so the typical peak period occurs any time the facilities are in full use.

For the specific development proposal, the typical traffic generation peak is whenever all ballfields have consecutively-scheduled games and the intermission between games occurs simultaneously. Because it is against the Applicant's interests to limit use of the facilities once they are built, and because neither the Applicant nor the County has the ability to require and ensure that such conditions do not arise, these typical traffic generation peak conditions must be used as the basis for the traffic impact analysis. (Note: Although it may be determined that it is not necessary or cost-effective to provide the roadway *capacity* needed to serve such peaks, it essential that the improvements necessary for traffic and pedestrian *safety* during such peaks are identified and implemented.)

Trip Generation

Using the Applicant's estimate of the number of officials, coaches, players, and spectators at each filed, the estimated traffic generation for the typical episodic peak used for this analysis totals 200 vehicles entering the site and 200 exiting during a 30-minute period:

1 umpire and 3 coaches:	4 trips
12 players picked up or dropped off:	24 trips
24 spectators and 12 players @ 3/car:	12 trips
Total:	40 trips
x 5 fields:	200 trips

Trip Distribution

The episodic peak conditions used for this analysis are typically associated with tournament play, for which a large majority of trips will be arriving from the north and west via Glenrose Road and 37th Avenue. For the purposes of this analysis, trip distribution was estimated to be 5% to/from the east via 37th, 10% to/from the south via Glenrose, and 85% to/from the north and west via 37th and Glenrose. For traffic using the Glenrose access, the distribution was estimated to be 60% to/from the north via Glenrose and 25% to/from the west via 37th, while for traffic using the 37th access, the distribution was estimated to be 75% to/from the north via Glenrose and 10% to/from the west via 37th.

The background traffic volumes used in this analysis (i.e., the traffic not traveling to or from the site) are compiled in **Figure 1** (the background volumes are the April, 2009, intersection counts collected and reported by the Applicant). Site traffic distribution is compiled in the form of intersection volumes in **Figure 2**; trip distributions were compiled for five scenarios:

1. Full development (5 ballfields), with one site access on Glenrose
2. Full development (5 ballfields), with one site access on 37th
3. Full development (5 ballfields), with site accesses on Glenrose and on 37th
4. Full development (5 ballfields), with site entrance on 37th and exit on Glenrose
5. Initial development (3 ballfields), with one site access on 37th

Traffic Speeds and Sight Distance

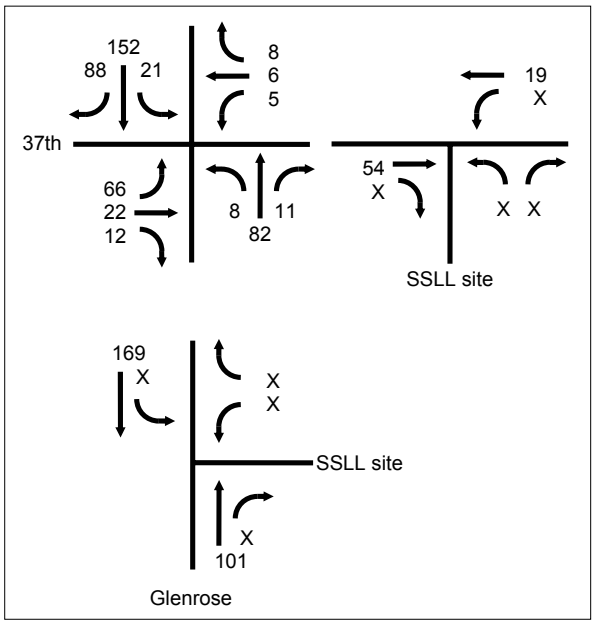
Traffic speed data were collected on Glenrose Road at two key locations, one north of 37th Avenue and one near the location of the proposed site access south of 37th (see **Figure 3**). The speed data were used to determine sight distance requirements.

Traffic Speeds

The speed data are compiled in **Table 1**, and speed limit compliance results at the two count locations are compiled in **Table 2**. As shown in the Tables, speeds on Glenrose Road are excessive (as reported anecdotally by area residents), and compliance with the 35-mph speed limit is minimal.

Figure 1: April 2009 Traffic Volumes

Weekday, 5 p.m. – 6 p.m.



Saturday, Noon – 1 p.m.

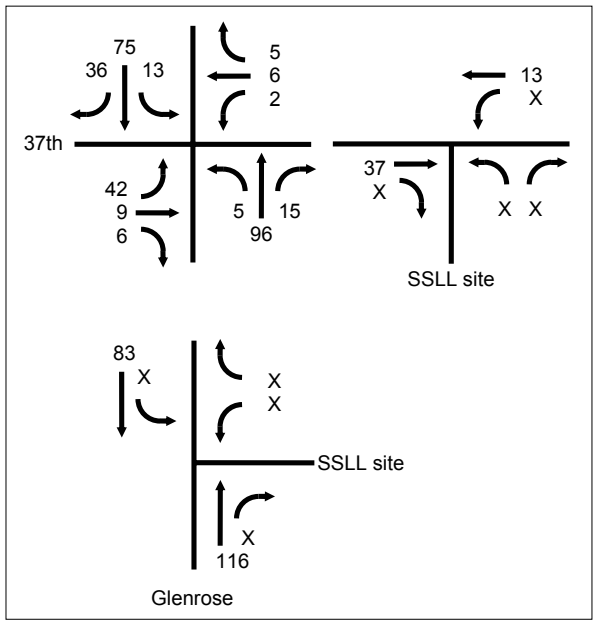
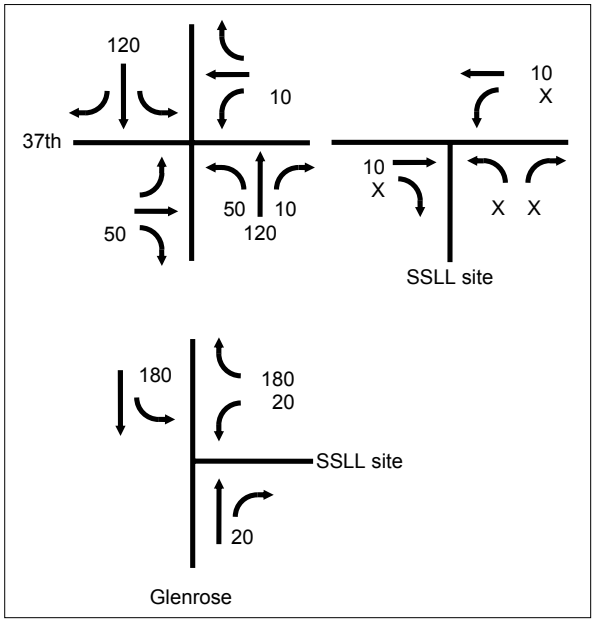


Figure 2a: Site-Generated 30-min Peak* Traffic Volumes

***** *period between concurrent consecutively-scheduled games at all fields***

5 ballfields; Glenrose access only



5 ballfields; 37th access only

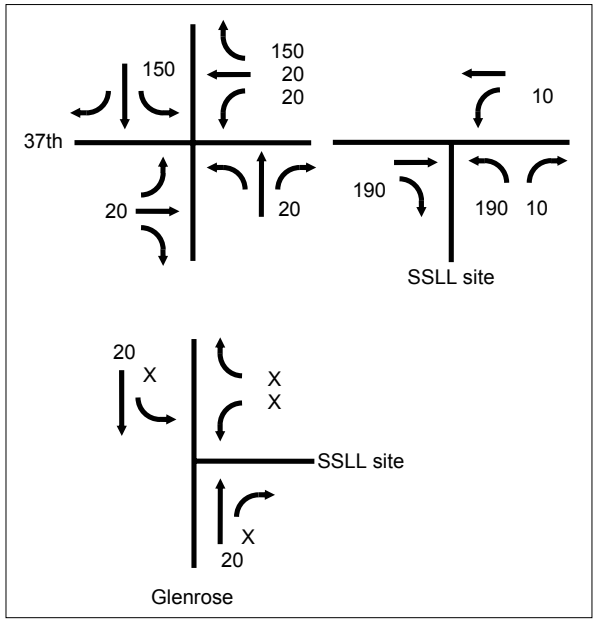
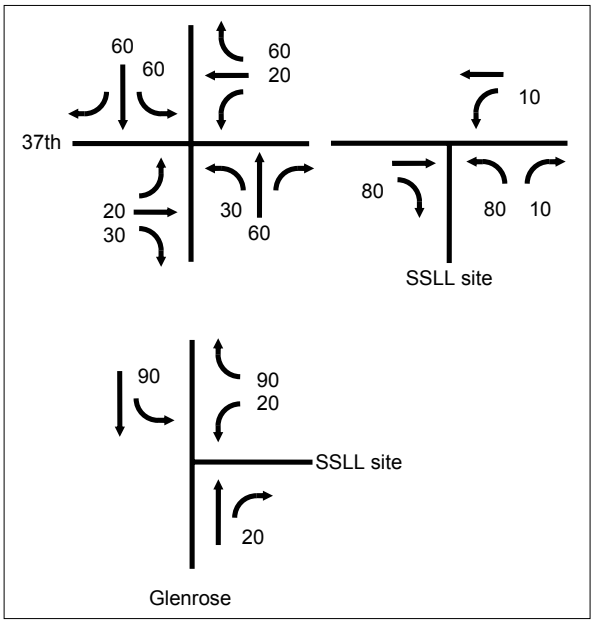


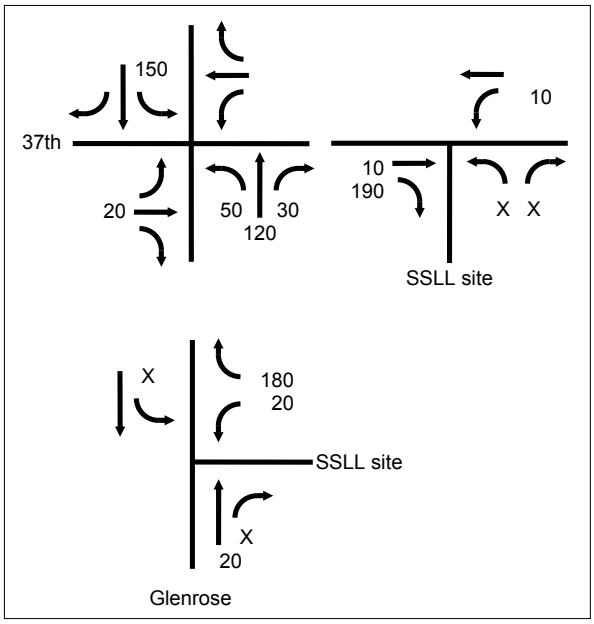
Figure 2b: Site-Generated 30-min Peak* Traffic Volumes

period between concurrent consecutively-scheduled games at all fields

5 ballfields; 2 accesses (Glenrose and 37th)



5 ballfields; Glenrose out only, 37th in only



3 ballfields (initial phase); 37th access only

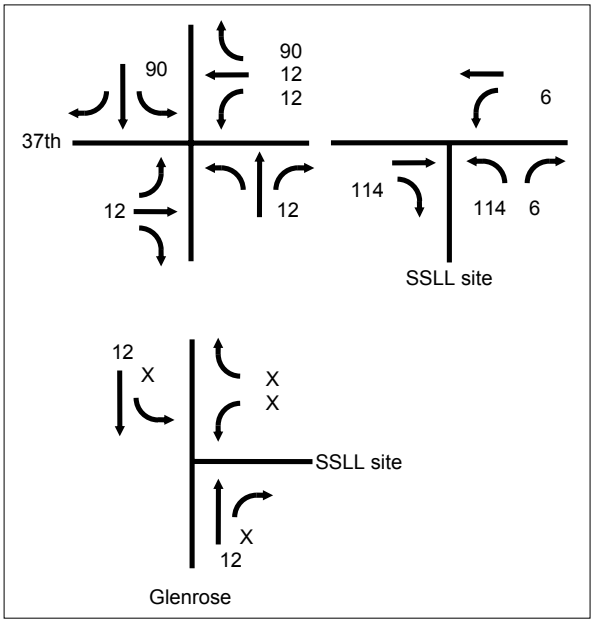


Figure 3: Glenrose Road Speed Count Locations

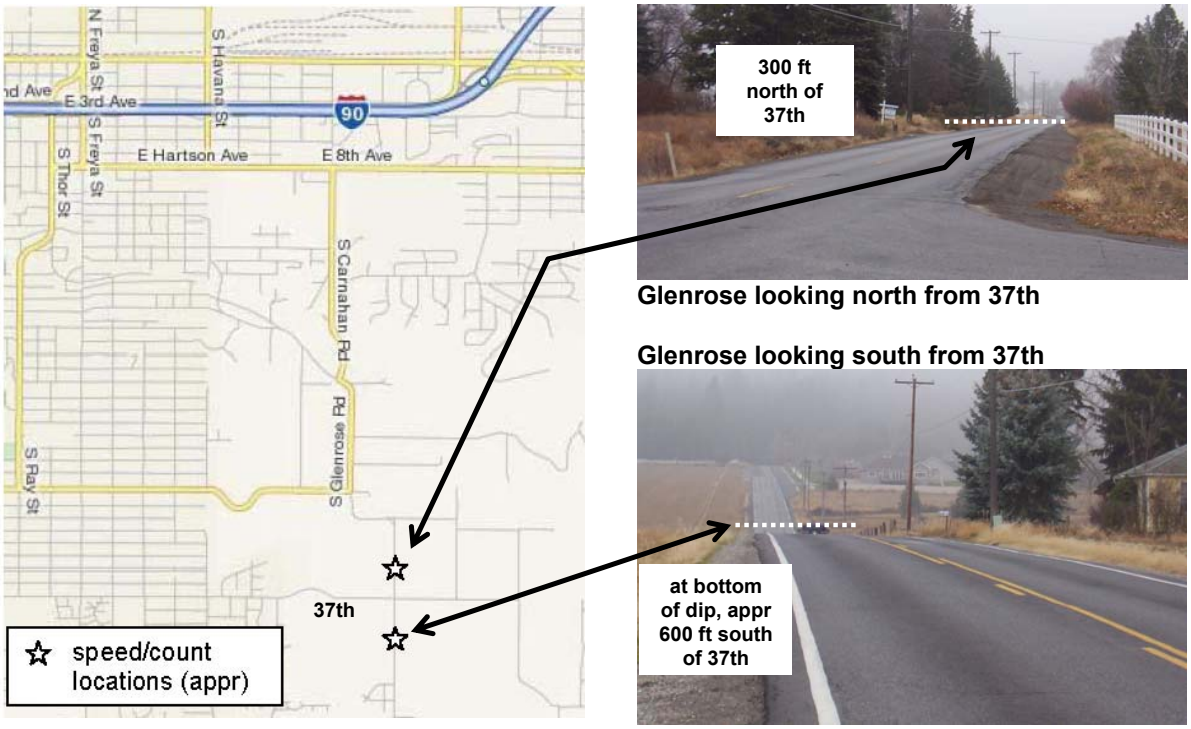


Table 1: Glenrose Road Traffic Speeds

Count Location/Date	24-hr Traffic Volume	85th %ile speed [a]	
		SB	NB
North of 37th (300 ft north of intersection)			
Thu March 11	3,850	39.3	43.3
Fri Mar 12	3,970	39.5	43.7
Sat Mar 13	3,060	40.5	44.5
South of 37th (bottom of dip by SSLL site)			
Thu March 11	2,750	43.0	44.4
Fri Mar 12	2,890	43.5	44.9
Sat Mar 13	2,250	44.7	48.3

a) 85th %ile speed is the speed at or under which 85% of motorists travel. This is the so-called "safe speed" which is used as the basis for evaluating speed limits and speed-dependent roadway design and traffic control elements.

Table 2: Glenrose Road Speed Limit Compliance

Count Location/Date	24-hr Traffic Volume	Speed Limit Compliance (% traffic < 35mph)	
		SB	NB
North of 37th (300 ft north of intersection)			
Thu March 11	3,850	49%	27%
Fri Mar 12	3,970	44%	26%
Sat Mar 13	3,060	38%	24%
South of 37th (bottom of dip by SSLL site)			
Thu March 11	2,750	19%	14%
Fri Mar 12	2,890	16%	10%
Sat Mar 13	2,250	9%	3%

Sight Distance

Two types of sight distance are critical to providing safe traffic operations at site accesses: Stopping Sight Distance and Intersection Entering Sight Distance:

> Stopping Sight Distance is the distance along a roadway that a below-average driver and/or vehicle would need to safely stop in order to avoid an obstruction (in the case of the site access, potential "obstructions" that need to be seen by approaching drivers include vehicles exiting the site, queues of vehicles waiting to enter the site, pedestrians crossing the street, and deer).
>
> Intersection Entering Sight Distance is the distance along a main roadway that a motorist turning left from a driveway or sidestreet onto that roadway would need to be able to see on-coming traffic in order to make the left turn safely.

Stopping and Entering Sight Distances are a basic component of safe design, and the requirements are based on traffic speed, roadway alignment, and view obstructions. Sight distance standards are based on the laws of physics, and are not arbitrarily-set standards. Required sight distances for the measured traffic speeds on Glenrose road are compiled in **Table 3**.

As shown in the Table, stopping sight distance on southbound Glenrose is 357 feet. This is the minimum distance necessary to maintain safe traffic operations between the roadway crest south of 37th and the back of any queue waiting to turn left into the site access. The Table also shows that entering sight distance to the north for the site access on Glenrose is nearly 500 feet. Since the roadway crest south of 37th limits entering sight distance, the site access must be located at least 500 ft south of it.

Table 3: Sight Distance Requirements at Glenrose Road Site Access

source: Exh 9-55, *Geometric Design of Highways and Streets*, AASHTO, 2004

	85th percentile speed [a]	Stopping Sight Distance [b] [Glenrose traffic]	Intersection Entering Sight Distance [c] [left turns out of site]
Northbound Glenrose Rd	48.3	403 ft	536 ft
Southbound Glenrose Rd	44.7	357 ft	497 ft

a) 85th %ile speed is the speed at or under which 85% of motorists travel. This is the so-called "safe speed" which is used as the basis for evaluating speed limits and speed-dependent roadway design and traffic control elements.

b) The intersection entering sight distance is the distance along a main roadway that a motorist turning left from a driveway or sidestreet onto that roadway would need to be able to see on-coming traffic in order to make the left turn safely.

c) The stopping sight distance is the distance along a roadway that a below-average driver and/or vehicle would need to safely stop in order to avoid an obstruction.

Traffic Operations

Traffic operations were analyzed at the Glenrose road/37th Avenue intersection for each of the five episodic peak use scenarios for which trip generation and distribution were estimated:

1. Full development (5 ballfields), with one site access on Glenrose
2. Full development (5 ballfields), with one site access on 37th
3. Full development (5 ballfields), with site accesses on Glenrose and on 37th
4. Full development (5 ballfields), with site entrance on 37th and exit on Glenrose
5. Initial development (3 ballfields), with one site access on 37th

The analysis determined level of service (LOS) and delay as a means of measuring and evaluating the potential impacts of the proposed development.

Traffic Operations Analysis Methodology

The Highway Capacity Manual, published by the Transportation Research Board and used nationwide, defines LOS as follows:

> *"Level of Service" (LOS) is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.*
>
> *Six LOS are defined for each type of facility that has analysis procedures available. Letters designate each level, from A to F, with A representing the best operating*

conditions and F the worst. Each level of service represents a range of operating conditions and the driver's perception of those conditions. Safety is not included in the measures that establish LOS."[1]

LOS is used by planners, engineers, and the lay public alike to assess traffic conditions, to identify problems, and to develop improvements and "solutions." In addition, local governments and other public agencies responsible for transportation use LOS to set standards for traffic conditions.

LOS is determined for the peak 15 minutes of a 1-hour period. The traffic volumes on which LOS analyses are based can be traffic forecasts or actual traffic counts. In addition to traffic volumes, LOS is based on roadway characteristics (numbers and configuration of lanes, lane width, roadway grade, etc.) and the types of traffic controls. For Two-Way Stop Control (TWSC) intersections, like Glenrose/37th, LOS is determined for the individual "minor" movements (i.e., those movements that must stop or yield), and is based on average delay for vehicles entering the intersection. LOS criteria for TWSC intersections are as follows:

LOS	control delay
A	≤ 10 sec/veh
B	10-15 sec/veh
C	15-25 sec/veh
D	25-35 sec/veh
E	35-50 sec/veh
F	> 50 sec/veh

Source: HCM2000, Exh 17-2

The peak 15-minute volumes used to do the LOS/delay calculations for this report were determined by adding – for each traffic movement at the intersection – the peak 15-minute volume found in the April, 2009, counts reported by the Applicant and one-half of the estimated 30-minute peak volume for the various episodic peak scenarios (see **Figures 1** and **2**).

Traffic Operations Analysis Results

LOS and delay for stop-controlled eastbound and westbound 37th Avenue at Glenrose Road for existing (April, 2009) conditions and for the five episodic peak and site access scenarios are compiled in **Table 4**.

As shown in the Table, LOS is good and delays are minimal for existing 2009 conditions at Glenrose/37th. However, the addition of site traffic degrades traffic operations to LOS E-F and increases delays dramatically. The scenarios that generate the greatest volume on the westbound

[1] *Highway Capacity Manual* (HCM2000), Transportation Research Board, National Research Council, 2000, p. 2-2

37th intersection approach and the largest numbers of eastbound through movements across Glenrose degrade LOS and increase delays the most.

Table 4: Traffic Operations at Glenrose/37th Intersection

(all analyses based on 2009 volumes)

Scenario	Weekday P.M. Peak		Saturday Noon	
	LOS	avg delay (sec/veh)	LOS	avg delay (sec/veh)
April 2009 Counted Volume				
Eastbound 37th at Glenrose	B	14	B	11
Westbound 37th at Glenrose	B	12	B	10
5 ballfields; Glenrose access only				
Eastbound 37th at Glenrose	***F***	***38***	D	25
Westbound 37th at Glenrose	***E***	***71***	D	28
5 ballfields; 37th access only				
Eastbound 37th at Glenrose	***F***	***520***	***F***	***143***
Westbound 37th at Glenrose	***F***	***99***	***E***	***40***
5 ballfields; 2 accesses (37th and Glenrose)				
Eastbound 37th at Glenrose	***F***	***228***	***F***	***52***
Westbound 37th at Glenrose	C	24	C	18
5 ballfields; 37th enter only and Glenrose exit only				
Eastbound 37th at Glenrose	***F***	***249***	***F***	***60***
Westbound 37th at Glenrose	***E***	***37***	C	24
3 ballfields (initial phase); 37th access only				
Eastbound 37th at Glenrose	***F***	***53***	D	27
Westbound 37th at Glenrose	C	21	C	16

Findings and Recommendations

Findings

- Traffic speeds on Glenrose Road are excessive, significantly increasing the hazards associated with the inherent conflicts between through traffic and site traffic at the site accesses and between through traffic and turning traffic at the 37th/Glenrose intersection, and increasing the necessary sight distances at the site driveway on Glenrose.

- Traffic generated by the SSLL fields will create significant congestion and delay for eastbound and westbound traffic on 37th Avenue at the Glenrose intersection stop sign during periods of peak site use and typical use, and prior to full site development.

- Traffic exiting the site onto 37th will enter the 37th/Glenrose intersection on a stop-controlled approach will have a disproportionately greater impact on congestion and delay than will traffic exiting onto Glenrose.

- Delays on westbound 37th at the Glenrose stop sign will encourage site traffic exiting onto 37th to divert to local neighborhood streets (e.g., Fancher) to avoid the intersection.

- At times of peak site usage there is significant potential for congestion in on-site parking lots that can back up cars onto 37th and Glenrose and block site accesses, causing queuing on 37th and Glenrose themselves. These access blockages and queue spillbacks cause significant safety hazards for area traffic and for site traffic.

- Congestion in the site parking lots and on internal site circulation drives – during typical and peak use periods –will encourage site visitors to park off-site in order to avoid on-site congestion and delay. On the public roads around the site high traffic speeds, the lack of adequate shoulders for on-street parking, the lack of walkable shoulders or sidewalks, and the lack of safe pedestrian crossings make on-street parking a serious hazard for moving traffic, for parked vehicles, and particularly for site visitors walking to/from their vehicles.

- Congestion in the site parking lots and circulation drives – during typical and peak use periods –will also encourage drop-offs of site users to be made off-site. As with off-site on-street parking, the high traffic speeds, the lack of walkable shoulders or sidewalks, and the lack of safe pedestrian crossings on the streets in the site vicinity, make off-site drop-offs a serious hazard for moving traffic, but more importantly, for those being dropped off, many/most of whom will be Little-Leaguers, soccer players, and other children.

Recommendations

1. In order to minimize the impact of site access/egress traffic operations on traffic operations at the 37th/Glenrose intersection, site accesses should be located as far as possible from the intersection.

2. In order to minimize on-site congestion and prevent it from impacting traffic safety on adjacent streets:

   2.1. Provide two accesses – one on 37th and one on Glenrose – that are both in operation on "opening day." (Even if the proposed development is phased, there is need for two accesses from the beginning, as the site cannot function safely with a single access in early phases.)

2.2. At all entrances, provide unimpeded parking lot entry throats of adequate length to prevent entrance blockage and queue spillback onto public streets.

2.3. Consolidate all parking in one area with efficient internal circulation.

3. In order to prevent site access traffic from queuing in the southbound travel lane of Glenrose Road:

3.1. Construct a left turn lane in Glenrose Road for southbound site access traffic.

3.2. In order to ensure that site entry queues never form in the southbound Glenrose travel lane, and to provide adequate sight distance for southbound Glenrose traffic approaching the site access and any queues formed there, the site access left turn lane and/or a center median should extend back at least to the roadway crest on Glenrose south of 37th, and preferably all the way to 37th.

4. Because entering sight distance for left-turning traffic exiting the site onto southbound Glenrose is inadequate (due to high speed of Glenrose traffic and the proximity of the hillcrest on Glenrose south of 37th), a left turn acceleration lane is needed south of the site access opposite the needed left turn lane for entering traffic..

5. In order to minimize the impact of site egress traffic on the Glenrose/37th intersection, and to reduce or eliminate the use of neighborhood streets to avoid the intersection, all site egress should be onto Glenrose Road (i.e., the site access on 37th should be for entering traffic only).

6. In order to discourage/prevent off-site parking and off-site drop-offs:

6.1. Adopt and post no parking zones along both sides of 37th and Glenrose in the site vicinity.

6.2. Fence the site in a manner that limits pedestrian access to the locations where vehicular access is provided.

6.3. Provide a drop-off area on-site that has convenient vehicular and pedestrian access and egress.

7. In order safely accommodate site generated traffic at the 37th/Glenrose intersection, several improvements are needed, including (i) the provision of left turn lanes on all approaches (to allow turns from the uncontrolled Glenrose approaches to made outside of the travel lanes, and to reduce the delays on the stop-controlled 37th approaches), and (ii) the installation of a flashing beacon to increase the visibility of the intersection and its control for approaching motorists.

ATTACHMENT

ROBERT BERNSTEIN, P.E.
Consulting Transportation Engineer/Planner

December 9, 2009

Glenrose Community Assn
c/o Mr. Peter Ice
3220 S Eastern Ave
Spokane, WA 99223

Mr. David Mann
Gendler & Mann, LLP
1424 Fourth Avenue, Ste 1015
Seattle, WA 98101

SUBJECT: Review of Traffic Issues Associated with Proposed Spokane South Little League Playing Fields in Spokane County, WA

Gentlemen:

I have reviewed and evaluated background information related to the project, including in particular the following documents:

- *Revised Trip Generation and Distribution Evaluation* (Storhaug Engineering, 5/11/09)
- Spokane County Grading Permit Application and Environmental Checklist (5/28/09)
- Supplemental SEPA Information (Storhaug Engineering, 8/19/09)

In addition, I visited the site on November 12, 2009 (see attached photos). Based on my personal observations and on my review and assessment of the available traffic/transportation-related information, I have the following comments and conclusions:

Conclusions

On matters of traffic and public safety, the County's Determination of Non-Significance (DNS) is in error due to missing and inaccurate information. As a result of the lack of complete and accurate information, the proposed development's actual impacts on traffic and public safety are overlooked, making it impossible to determine that the proposed development does not have significant impacts.

1. **The proposed development has significant traffic safety impacts that have not been acknowledged, analyzed, or addressed.**

2. **The proposed development has significant capacity and operations impacts that have not been acknowledged, analyzed, or addressed.**

3. **The Applicant underestimates site trip generation. (Accurate traffic safety and capacity analyses require accurate trip generation estimates as input.)**

Discussion

<u>Conclusion 1.</u> The DNS is in error because the proposed development has significant traffic safety impacts that have not been acknowledged, analyzed, or addressed.

The proposed development has several significant traffic safety impacts that have not been acknowledged, analyzed, or addressed:

- Excessive speeds on Glenrose

  Neighbors have reported, and my observations corroborate, that much of the traffic on Glenrose exceeds the 35-mph speed limit. The speeds on Glenrose increase both the potential for and the severity of resultant run-off-the-road crashes and intersection crashes (at 37th and at driveways).

- Visibility/sight distance at Glenrose/37th intersection is limited by roadway crest on Glenrose. (See **Photo 1**.)

  Visibility limitations increase the potential for intersection crashes.

- Stop-sign-running at Glenrose on 37th

  Neighbors report that vehicles traveling on 37th often run right through the stop signs at Glenrose, especially during hours of darkness or inclement conditions. It is not known whether these actions are the result of scofflaw behavior or just a matter of motorists not seeing the intersection and its stop signs. Regardless of the cause, the stop-sign-running is a significant hazard. This is not an uncommon phenomenon at similar intersections elsewhere in the county and state, and its implications for area residents, site traffic, and the general public should be addressed.

- Queuing on Glenrose at the proposed site access.

  As is well known by anyone who has ever gone to a soccer, baseball, or football game at a facility like the proposed facility – or has simply passed by such a facility – at peak times before, between, or after games, things can get very busy in the site parking lots. Traffic often clogs up, and queues made up of inbound traffic often form on the streets at the site entrance(s). If not properly accommodated in a turn lane, such queues can cause significant safety problems for street traffic trying to get past the queue and for site exiting traffic whose view of on-coming traffic is blocked by the queues.

  At the proposed site, the vertical alignment of Glenrose significantly exacerbates the hazards: the crest of the roadway south of 37th (see **Photo 1**) obscures/blocks southbound motorists' view of the end of any queue waiting to turn left into the site. This visual obstruction, combined with the high speeds on Glenrose, create a significant safety hazard for southbound traffic and site access traffic.

Photo 1: Southbound Glenrose Road

Roadway vertical crest obscures motorists' view of proposed parking lot entrance:

Glenrose looking south from 37th

Glenrose looking south from crest south of 37th

These impacts affect the safety of community residents, users of the proposed development, and the motoring public in general, and should be addressed.

Analyses needed include (1) the review and analysis of site vicinity accident records (the types and locations of accidents should be evaluated; a simple compilation of the number and rate of accidents is not adequate), (2) a speed study and determination/evaluation of sight distance adequacy, and (3) an analysis of queuing and its impact on visibility and safety.

<u>Conclusion 2.</u> The DNS is in error because the proposed development has significant traffic capacity and operations impacts that have not been acknowledged, analyzed, or addressed.

The introduction of site-generated traffic onto the site-vicinity road system will affect traffic operations at several key locations, including in particular the two proposed site driveways (on Glenrose south of 37th and on 37th east of Glenrose) and the existing Glenrose/37th intersection. Traffic operations analyses are needed at these locations not only to determine the level of service (LOS), but more importantly, to determine the extent of delay and queuing associated with the presence of site-generated traffic. These analyses are needed to provide the information required to determine what street and traffic control improvements (turn lanes, signage, illumination, etc) are needed to maintain safe and convenient access/circulation for all – community residents, site users, and motorists passing through alike.

It also should be recognized that the necessary analyses must be designed specifically for the site and proposed development. Unlike typical residential and commercial developments, use of the proposed development is "episodic" (event-based). The traffic capacity and operations analyses should reflect the episodic use by focusing on the brief, but intense, periods of concentrated traffic generation before, between, and after events held at the site. Although these periods can be short – 15 to 30 minutes in duration – the impacts of turning movements and queuing on traffic operations and safety can be significant, and a typical analysis of conditions over a one-hour analysis period will obscure or conceal those impacts.

<u>Conclusion 3.</u> The DNS is in error because the Applicant underestimates site trip generation. (Accurate traffic safety and capacity analyses require accurate trip generation estimates as input.)

The Applicant significantly underestimates site traffic generation by omitting from its estimate a key element of site traffic: drop-offs and pick-ups[1]. The Applicant makes a reasonable estimate of the numbers of participants, spectators, and staff/workers coming to the site for events, and the Applicant's estimate of vehicle occupancy for cars parking on-site, though optimistically high in my experience[2], also is reasonable enough. However, the omission of pick-ups and drop-offs significantly reduces the traffic generation estimate because a drop-off and pick-up involves twice as many vehicle trips (a trip to the site *and* away from the site before *and* after an event), and generally carries fewer site users: a participant who is dropped off by him/herself generates <u>six times</u> as many vehicle-trips as a participant who arrives in car that also carries two other participants and/or spectators and is parked on-site during the event. The effect of drop-offs and pick-ups on overall traffic generation is multiplied by the fact that they can make up a significant proportion of trips to/from the site.

[1] "Drop-offs and pick-ups" include participants who are dropped off before an event and picked up after, as well as participants who are dropped off before an event by spectators who later return when the event starts.

[2] Based on observations made as a professional and as a "Soccer and Baseball Dad"

The underestimation of traffic generation is of particular importance because it leads to an underestimation of impacts on traffic capacity and operations and on traffic safety:

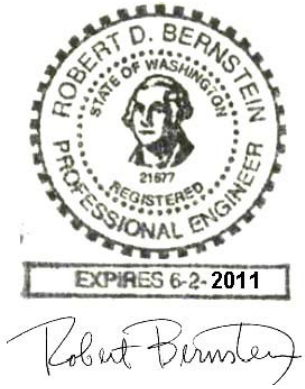
Intersection traffic capacity and level of service (LOS) analyses are based on traffic volumes. Consequently, the Applicant's underestimation of traffic volumes generated by the site will in turn result in an underestimation of delay and congestion at site access drives and at nearby intersections (particularly, Glenrose/37th).

Furthermore, because traffic safety problems are greater at higher traffic volumes, the Applicant's underestimation of traffic volumes generated by the site also results in an underestimate of the accident potential at site access drives and the degradation of traffic safety at nearby intersections.

If you have any questions or if you need additional information, please contact me.

Sincerely,

Robert Bernstein, P.E.



Summary of Qualifications. I have Bachelor's and Master's degrees in Civil Engineering (from Georgia Tech and Northwestern University, respectively), and I am a registered professional engineer in Oregon, Washington, California, Idaho, and New Jersey. I have over 30 years of transportation planning and traffic engineering experience, including five years with the City of Portland and seven years with the Puget Sound Council of Governments. In these positions and as a private consultant, I have prepared the transportation element for a dozen city and county comprehensive plans and numerous downtown plans, and I have conducted a wide variety of regional and subregional travel demand forecasting studies, traffic operations and safety analyses, and neighborhood traffic management studies. In addition, I have provided on-call development review services for several cities in Oregon, Washington, and California, and over the last 25 years I have provided expert assistance on development-related traffic issues to over 100 community and neighborhood groups (including nine in Spokane and Spokane County).

Attachment: Site Vicinity Photos

37th looking east across Glenrose

37th looking west from Glenrose

Glenrose looking north from 37th

Glenrose looking south from 37th

Glenrose looking north from crest south of 37th

Glenrose looking south from crest south of 37th