



Memorandum

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Subject: Freight Alignment – Traffic Impact Evaluation

This technical memorandum summarizes the traffic impact evaluation of the currently proposed Freight Co-Location and Relocation alignments. The expected traffic impacts were previously presented in the Southwest LRT Draft Environmental Impact Statement (DEIS); however, the proposed alignments have since been adjusted and updated alignment and traffic volume information is now available regarding the proposed alignments and freight rail volumes. This memorandum serves to update the analysis and documentation of the expected impacts of the proposed freight alignments, as well as compare these impacts to those previously documented in the DEIS. A full evaluation of the preferred alternative for freight rail will be part of the Final Environmental Impact Statement (FEIS).

1.0 Freight Co-Location Alternatives

The Freight Co-Location alternatives include the Kenilworth Deep Bore LRT Tunnel (LRT 3A-1-SLP/MPLS-A2) and the Kenilworth Shallow LRT Tunnel (LRT 3A-1-SLP/MPLS-A1). Both alternatives include at-grade freight rail and LRT crossings at Wooddale Avenue and Beltline Boulevard in St. Louis Park. In Minneapolis, both alternatives include at-grade freight rail crossings and grade separated LRT crossings (tunnels) at Cedar Lake Parkway and 21st Street, which from a traffic and freight perspective is similar to the existing and No Build conditions. Therefore, from a vehicular traffic perspective, the two freight rail alternatives would both be expected to have similar impacts.

The analysis presented in the DEIS is based on the expected maximum queue resulting from a freight train arrival during the peak 15-minute period. A similar approach has been used for the current alignments, since the delay from a single freight event is more accurately represented by the maximum queues than the level of service at the crossing, which is based on vehicle delay averaged

over an hour. Minor adjustments in the LRT alignment or crossing configuration that have occurred as the project was refined since the DEIS have not been included in this analysis. The specific alignment of the LRT tracks relative to the freight rail tracks does not influence the travel of freight traffic through the crossing, therefore these minor changes in the LRT alignment are not expected to result in significant differences in the impacts of the freight rail alternatives.

As stated in Chapter 6 of the DEIS, the DEIS analysis included analysis of existing freight traffic at Wooddale Avenue and Beltline Boulevard, assumed to consist of a 30-car train at 10 miles per hour (mph), and a 2030 worst case scenario of a 50-car train traveling at 10 mph. The freight rail crossings at Cedar Lake Parkway were analyzed for a 50-car train at 10 mph for both existing and 2030 conditions. From a traffic perspective, the Freight Co-Location Alternative has not changed substantially from what was defined in the DEIS. However, as described in the following paragraphs, additional and more refined information is available from which to better define the potential impacts.

Vehicle traffic counts were conducted at each crossing in 2013, and data was also gathered about the length and arrival time of freight trains. This data has been included in the Appendix. Data collected at the crossings in 2013 showed that the 30-40 car freight trains typically travel through the corridor after the AM peak hour and after the PM peak hour. The longer 80-125 car freight trains can arrive at any time during the day, including overnight. Current information from the Twin Cities and Western Railroad (TC&W) indicates that 14 weekly trains (2 per day) with 65-75 cars and 5-6 weekly unit trains with 80-125 cars are expected. For the purposes of the analysis, all train cars were assumed to be 85 feet in length. This is a conservative assumption given that a typical grain car is approximately 65 feet in length, and the DEIS assumed a 60-foot rail car.

Freight trains are allowed to travel up to 25 mph under existing conditions at the Wooddale Avenue and Beltline Boulevard crossings and assumed to be able to travel up to this speed under Build conditions as well. In addition, rail sidings will be removed in the Build conditions along the entire Bass Lake Spur from approximately TH 169 to Beltline Boulevard, eliminating the backing of trains at freight crossings that occurs under existing conditions. Note that although the freight rail infrastructure is being improved and will be designed to accommodate freight traffic up to 25 mph, the freight rail operator, Twin Cities & Western, has indicated that they would continue to travel through the Cedar Lake Parkway and 21st Street crossings at 10 mph. Therefore, the expected maximum vehicle queues based on both 10 mph and 25 mph freight travel speeds are shown at Cedar Lake Parkway and 21st Street, in order to capture the worst case.

The impacts of a freight crossing are based on three primary factors:

- Time of day at which the train arrives
- Length of the train (number of cars)
- Speed at which the train travels through the crossing

Relative to time of day, the current data shows it is rare for a train to

arrive during the peak hour. Even if the overall number of freight trains per day were to increase, the arrival of more than one freight train during the peak hour is extremely unlikely due to the distance that trains must travel on the single track configuration through the corridor. Therefore the analysis presented in the DEIS relative to one train arriving in the peak 15-minute period is still considered to be the worst case.

The factors of train length and travel speed are integrally related, because together they determine the amount of time a crossing is blocked. The arrival of any freight train in the peak hour would represent the worst case condition in terms of time of day. However, this is not likely to occur given the current schedules of the freight rail operators and the Northstar commuter rail, but if it were to occur the likely train length would be 65-75 cars based on the frequency of these trains. Therefore, a 75-car freight train arriving in the peak 15 minutes of the peak hour was chosen for the freight analysis. Although the absolute worst case condition would be the arrival of a 125-car freight train during the peak hour, this scenario would be unlikely based on the other freight rail traffic and the schedule of the 125-car trains, which can arrive at any time of the day or night. Since the arrival of a 125-car freight train during the peak hour is not expected to occur under typical conditions, this scenario was not analyzed.

Table 1 below shows the crossing block times analyzed in the DEIS for 2030 conditions compared to the updated crossing block times based on updated freight traffic and alignment information.

Table 1. Freight Co-Location Crossing Blockage Times

Location	2030 DEIS Crossing Analysis	2030 Updated Crossing Analysis
Wooddale Avenue	50-car train at 10 mph = 232 seconds ¹	75-car train at 25 mph = 177 seconds
Beltline Avenue		
Cedar Lake Parkway	Not Analyzed	75-car train at 10 mph = 441 seconds
21 st Street		75-car train at 25 mph = 177 seconds

Based on the estimated crossing block times, the estimated maximum vehicle queues at the Wooddale Avenue and Beltline Boulevard crossings are estimated to be less than documented in the DEIS analysis (177 compared to 232 seconds). However, based on the longer 75-car train, the estimated maximum vehicles queues near the Cedar Lake Parkway crossing would be expected to be

¹ As documented in Table 1 of *Cedar Lake Parkway – At-grade Analysis* by WSB and Associates, Inc. dated April 20, 2010 and updated on March 2, 2012, which is included in Appendix H of the *Southwest Transitway Draft Environmental Impact Statement* dated September 2012. The DEIS documentation for the analysis of the Wooddale Avenue and Beltline Boulevard crossings does not specify the length of time the crossings were analyzed for a 50-car train at 10 mph, therefore the same value of 232 seconds was assumed for the purposes of this comparison.

greater than documented in the DEIS, due to an estimated crossing duration of 441 seconds compared to 232 seconds in the DEIS. **Table 2** shows the estimated queues at or near the Cedar Lake Parkway and 21st Street crossings as documented in the DEIS and the updated queues based on the current analysis.

Table 2. Summary of Queuing Analysis near Cedar Lake Parkway and 21st Street Crossings

Location	Time of Day	Direction	Estimated Maximum Queue (vehicles)		
			2030 DEIS Crossing Analysis*	2030 Updated Crossing Analysis	
			50-car Train at 10 mph	75-car Train at 10 mph	75-car Train at 25 mph
Burnham Road at Cedar Lake Parkway	AM	SB	3	3	1
	PM	SB	6	4	2
Xerxes Avenue at Cedar Lake Parkway	AM	NB	7	5	2
	PM	NB	5	5	2
Cedar Lake Parkway at Rail Crossing	AM	EB	22	34	14
		WB	33	80	32
	PM	EB	53	74	30
		WB	21	51	20
21 st Street at Rail Crossing	AM	EB	Not analyzed	1	0
		WB	Not analyzed	0	0
	PM	EB	Not analyzed	4	2
		WB	Not analyzed	4	2

*DEIS maximum queue length includes both freight and LRT crossings

Based on the estimated maximum queue lengths, the westbound traffic queue on Cedar Lake Parkway for a 10-mph train would be expected to reach past the Dean Parkway intersection in both the AM and PM peak hours, adversely impacting the intersection operations at Xerxes Avenue, Benton Boulevard, and Dean Parkway. The eastbound queue for a 10- mph train on Cedar Lake Parkway would be expected to impact the intersections at Burnham Road and Sunset Boulevard in both the AM and PM peak hours. Vehicle traffic could potentially use Burnham Road, which is grade separated over the freight rail, to avoid the Cedar Lake Parkway

crossing when it is occupied by a freight train. However, the existing counts did not appear to show an increase in vehicle traffic turning from eastbound Cedar Lake Parkway onto Burnham Road or from southbound Burnham Road onto westbound Cedar Lake Parkway during the 15-minute periods when the freight crossing was occupied. In addition, only the first one or two vehicles in the eastbound queue could access Burnham Road, due to the proximity of the intersection to the crossing. In addition, Burnham Road is a one-way eastbound roadway at the bridge over the freight railroad and therefore not available as a cut-through route for westbound traffic. These factors make Burnham Road an unattractive route for most drivers, even when the freight crossing is blocked for an extended period. Therefore, impacts due to cut-through traffic on Burnham Road during freight crossing events are not expected to be significant.

The estimated queues at the 21st Street crossing were not documented in the DEIS, but are not expected to be significant or impact upstream intersections.

The results of the Freight Co-location Alternatives analysis relative to impacts on vehicle traffic can be summarized as follows:

1. At the Cedar Lake Parkway crossing, a freight train that arrives during the peak hour potentially has more impact than stated in the DEIS based on the assumption of a longer freight train.
2. The movement of freight trains at the Cedar Lake Parkway and 21st Street crossings in the Build conditions will be substantially the same as the No Build conditions based on the grade separation of LRT at the crossings.
3. At the Wooddale Avenue and Beltline Boulevard crossings, a freight train that arrives during the peak hour is expected to have less impact than stated in the DEIS due to higher assumed operating speeds that can be achieved with an upgraded rail facility and alignment.

2.0 Freight Relocation Alternative

The analysis of the Freight Relocation alternative as documented in the DEIS included at-grade crossings at Walker Street, Lake Street, Library Lane, Dakota Avenue, and 28th Street in St. Louis Park. The 29th Street crossing in St. Louis Park was proposed to be closed. The analysis included the queuing impacts in the Build conditions of a 50-car train at 15 mph and a 120-car train at 10 mph.

Elements of the Freight Relocation alignment have changed substantially since the DEIS and the current Brunswick Central alignment (LRT 3A-SLP-MPLS- A) includes at-grade crossings only at 28th Street in St. Louis Park, with the 29th Street crossing still proposed for closure. All other crossings would be grade separated. Updated traffic counts were conducted at these locations in 2013, and data was also gathered about the length and arrival time of freight trains. This data has been included in the Appendix. The Canadian Pacific Railroad (CP) currently operates one 30-car train per day through this area. In addition, current information from the Twin Cities and Western Railroad (TC&W) indicates that 14 weekly trains (2 per day) with 65-75 cars and 5-6 weekly unit trains with 80-

125 cars should be expected. The freight trains are assumed to be able to travel at 25 mph based on the design speeds of the new alignment. For the purposes of the analysis, all train cars were assumed to be 85 feet in length. This is a conservative assumption given that a typical grain car is approximately 65 feet in length, and the DEIS assumed a 60-foot rail car.

The impacts of a freight crossing are based on three primary factors:

- Time of day at which the train arrives
- Length of the train (number of cars)
- Speed at which the train travels through the crossing

Relative to time of day, the current data shows it is rare for a train to arrive during the peak hour. Even if the overall number of freight trains per day were to increase, the arrival of more than one freight train during the peak hour is extremely unlikely due to the distance that trains must travel on the single track configuration through the corridor. Therefore the analysis presented in the DEIS relative to one train arriving in the peak 15-minute period is still considered to be the worst case.

The factors of train length and travel speed are integrally related, because together they determine the amount of time a crossing is blocked. The arrival of any freight train in the peak hour would represent the worst case condition in terms of time of day. However, this is not likely to occur given the current schedules of the freight rail operators and the Northstar commuter rail, but if it were to occur the likely train length would be 65-75 cars based on the frequency of these trains. Therefore, a 75-car freight train arriving in the peak 15 minutes of the peak hour was chosen for the freight analysis. Although the absolute worst case condition would be the arrival of a 125-car freight train during the peak hour, this scenario would be unlikely based on the other freight rail traffic and the schedule of the 125-car trains, which can arrive at any time of the day or night. Since this condition is not expected to occur under typical conditions, this scenario was not analyzed.

Table 3 shows the crossing block times analyzed in the DEIS for 2030 conditions compared to the updated crossing block times based on updated freight traffic and alignment information. All other roadway crossings that are part of the Brunswick Central alignment are proposed to be grade separated. Therefore, there would be no impacts to vehicular traffic at these locations under the updated analysis.

Table 3. Freight Relocation Crossing Analysis

Location	Estimated Maximum Queue (vehicles)			
	2030 DEIS Crossing Analysis		2030 Updated Crossing Analysis	
	50-car train at 15 mph = 198 seconds ²	120-car train at 10 mph = 702 seconds ²	75-car train at 25 mph = 177 seconds	
			AM	PM
28 th Street	5	16	EB = 2 WB = 2	EB = 3 WB = 5
29 th Street	Proposed for Closure		Proposed for Closure	

Closure of the 29th Street grade crossing would be expected to result in the diversion of through vehicles, which would represent only a portion of the total daily traffic on 29th Street, to one of the adjacent roadways. The two adjacent roadways would continue to have crossings, with 28th Street at-grade and Minnetonka Boulevard grade separated. Even if all traffic from the 29th Street crossing diverted to either 28th Street or Minnetonka Boulevard, this would be an increase of only 10 to 15 vehicles in each of the peak hours. Therefore, no adverse traffic impacts are expected as a result of the closure of 29th Street at the railroad crossing.

The results of the Freight Relocation Alternatives analysis relative to impacts on vehicle traffic can be summarized as follows:

1. At the 28th Street crossing, a freight train that arrives during the peak hour is expected to have less impact than stated in the DEIS based on the assumption of higher operating speeds for the freight traffic.
2. The closure of 29th Street at the railroad crossing is not expected to substantially impact vehicular traffic on adjacent roadways.
3. The overall impacts to vehicular traffic of the updated Freight Relocation alignment are less than stated in the DEIS due to the elimination of the at-grade crossings at Dakota Avenue, Library Lane, Lake Street, and Walker Street.

² The values of 198 seconds and 702 seconds are not documented in the DEIS, but were calculated based on the information provided in Table 6.2-8 of the DEIS.

APPENDIX

AM Peak Hour Turning Movement Volumes (7:30-8:30)

Intersection	From North			From East			From South			From West			Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
06B Wooddale Ave & TH 7 Frontage Road	37	652	12	44	1	19	3	638	21	32	0	7	1478
08B Beltline Blvd & South Frontage Rd	52	374	16	13	1	10	23	503	13	1	1	11	1021
10B Cedar Lake Pkwy & Burnham Rd	17	0	5	55	492	0	0	0	0	0	246	33	862
10C Cedar Lake Pkwy & Xerxes Ave	0	0	0	0	500	0	10	0	48	1	254	0	817
12 21 St W & LRT Xing	0	0	0	0	1	1	0	0	0	1	6	0	163
27 29th St & RR Xing	0	0	0	0	5	0	0	0	0	0	4	0	10
28 28th St & RR Xing	0	0	0	0	38	0	0	0	0	0	17	0	55

PM Peak Hour Turning Movement Volumes (4:45 - 5:45)

Intersection	From North			From East			From South			From West			Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
06B Wooddale Ave & TH 7 Frontage Road	16	542	37	20	0	7	17	565	18	43	1	10	1276
08B Beltline Blvd & South Frontage Rd	3	401	3	4	0	18	31	425	1	10	0	18	914
10B Cedar Lake Pkwy & Burnham Rd	7	0	4	36	306	0	0	0	0	0	492	95	940
10C Cedar Lake Pkwy & Xerxes Ave	0	0	0	0	313	0	7	0	22	0	477	0	819
12 21 St & LRT Xing	0	0	0	0	32	0	0	0	0	0	27	0	59
27 29th St & RR Xing	0	0	0	0	6	0	0	0	0	0	9	0	15
28 28th St & RR Xing	0	0	0	0	73	0	0	0	0	0	50	0	123

Existing Railroad Crossings

Intersection	Direction	Date	Time of Train Crossing	Duration of Train Crossing	Number of Train Cars
28th St RR Xing	SB	2/13/2013	10:04 AM	35 seconds	7
	NB	2/13/2013	1:19 PM	12 seconds	3
	SB	2/14/2013	10:38 AM	22 seconds	5
	NB	2/14/2013	1:16 PM	89 seconds	19
29th St RR Xing	SB	2/13/2013	10:03 AM	28 seconds	7
	NB	2/13/2013	1:17 PM	15 seconds	3
	SB	2/14/2013	10:37 AM	19 seconds	5
	NB	2/14/2013	1:14 PM	64 seconds	19
Wooddale Ave RR Xing	EB	2/13/2013	9:57 AM	70 seconds	37
	EB	2/13/2013	6:01 PM	290 seconds	83
Cedar Lake Pkwy RR Xing	NEB	2/13/2013	10:07 AM	148 seconds	37
	NEB	2/13/2013	6:12 PM	411 seconds	83
	SWB	2/13/2013	8:24 PM	133 seconds	30
	SWB	2/14/2013	3:51 AM	510 seconds	135
	NEB	2/14/2013	9:49 AM	115 seconds	27
	SWB	2/14/2013	6:39 PM	105 seconds	26